Appendix F

Building 29 Data Package

Molycorp Washington, PA

Building 29 Data Package

This data package contains final status survey information for Building 29, Molycorp, Washington, PA site.

Field data collection forms, survey report forms, statistical test results, and comparisons to release limits are provided.

Summary

During the final status survey of Building 29, elevated radioactivity was identified in multiple localized areas on the concrete floor and on several structural support components of the building (purlins). The building's classification was changed from unaffected to affected, and an affected final status survey was performed.

It was determined that the activity identified on the floor was fixed into the concrete, and required surface removal of the concrete in the identified areas. The activity identified on the purlins was also determined to be fixed contamination. The structural integrity of the building was evaluated without the affected purlins (removed due to fixed contamination). It was concluded that the purlins needed to remain in place until building demolition.

The areas on the purlins, identified as contaminated, have been marked with a bright florescent paint and recorded as being contaminated in a log controlled by the project manager. These contaminated purlins will remain in place until just prior to building demolition.

Remediation of the concrete was performed. All post-remedial surveys indicated that remediation activities were successful, and that all the affected concrete was removed.

Elevated levels of background radiation, from soil radioactivity, continued to be a presence during survey activities of Building 29.

Results from the final status survey of Building 29 provides evidence that release criteria have been met, demonstrates that residual radioactivity is below the unrestricted use criteria, and confirms that Building 29 is suitable for unrestricted use, excluding the contaminated purlins that will be removed just prior to building demolition.

Results of Surface Scans
Molycorp - Building 29 Survey Unit (Affected Area)

Building Floor

Location (see map)	Beta Scan gross cpm	Beta Scan net cpm	Alpha Scan gross cpm	Alpha Scan net cpm
F1	1500	30	10	3.6
F2	1500	30	11	4.6
F3	1550	80	9	2.6
F4	1600	130	12	5.6
F5	1600	130	12	5.6
F6	1600	130	8	1.6
F7	1800	330	14	7.6
F8	1700	230	12	5.6
F9	1450	-20	13	6.6
F10	1650	180	10	3.6
F11	1600	130	11	4.6
F12	1500	30	8	1.6
F13	1600	130	14	7.6
F14	1550	80	12	5.6
F15	1600	130	12	5.6
F16	1700	230	16	9.6
F17	1700	230	14	7.6
F18	12500	11030	26	19.6
F19	15000	13530	60	53.6
F20	1600	130	12	5.6
F21	1300	-170	12	5.6
F22	1700	230	10	3.6
F23	1750	280	15	8.6
F24	1700	230	12	5.6
F25	4000	2530	20	13.6
F26	12000	10530	16	9.6
F27	1800	330	14	7.6
F28	1800	330	11	4.6
F29	1700	230	12	5.6
F30	1650	180	8	1.6
F31	1600	130	13	6.6
F32	1900	430	15	8.6
F33	13000	11530	84	77.6
F34	5000	3530	22	15.6
F35	3600	2130	30	23.6
F36	2300	830	12	5.6
F37	1700	230	9	2.6
F38	1470	0	10	3.6
F39	1600	130	16	9.6
F40	1800	330	14	7.6
F41	1780	310	12	5.6
F42	1600	130	10	3.6
F43	1600	130	13	6.6
F44	1450	-20	8	1.6
F45	1600	130	11	4.6
F46	1700	230	12	5.6

F47	1700	230	12	5.6
F48	2100	630	14	7.6
F49	1900	430	10	3.6
F50	20000	18530	100	93.6
F51	1820	350	14	7.6
F52	1700	230	10	3.6
F53	1550	80	12	5.6
F54	2000	530	14	7.6
F55	1600	130	12	5.6
F56	1600	130	11	4.6
F57	10000	8530	100	93.6
F58	3600	2130	26	19.6
F59	1830	360	12	5.6
F60	1600	130	12	5.6
F61	1600	130	15	8.6
F62	2400	930	14	7.6
F63	1950	480	10	3.6
F64	1800	330	11	4.6
F65	1600	130	12	5.6
F66	1700	230	14	7.6
F67	1600	130	12	5.6
F68	1600	130	12	5.6
F69	1800	330	10	3.6
F70	1700	230	13	6.6
F71	1500	30	14	7.6
F72	1700	230	12	5.6
F73	1800	330	14	7.6
F74	1600	130	15	8.6
F75	13000	11530	20	13.6
F76	6000	4530	15	8.6
F77	1980	510	12	5.6
F78	2000	530	13	6.6
F79	1650	180	11	4.6
F80	1700	230	15	8.6
F81	1620	150	12	5.6
F82	1900	430	10	3.6
F83	2000	530	12	5.6
F84	3200	1730	18	11.6
F85	2300	830	12	5.6
F86	2300	830	14	7.6
F87	1800	330	10	3.6

All floor scans performed with Ludlum 239-1F (2350-1 No.95359)
with 43-37 No. 92503

Floor Monitor Info:
Scan MDA Beta - 188 dpm/detector area
Scan MDA Alpha - 16 dpm/detector area
Scan background Beta - 1470 cpm
Scan background Alpha - 6.4 cpm
Detector Eff. Beta - .27
Detector Eff. Alpha - .207

Results of Surface Scans
Molycorp - Building 29 Survey Unit (Affected Area)

Building Walls (Interior)

Location (see map)	Beta Scan gross cpm	Beta Scan net cpm	Alpha Scan gross cpm	Alpha Scan net cpm
W1	300	36	0.6	-0.4
W2	265	1	0.6	-0.4
W3	225	-39	1	0
W4	265	1	1	0
W5	245	-19	0.2	-0.8
W6	250	-14	0.5	-0.5
W7	300	36	1.2	0.2
W8	260	-4	0.4	-0.6
W9	280	16	1	0
W10	300	36	1	0
W11	220	-44	0.4	-0.6
W12	340	76	1.4	0.4
W13	290	26	1	0
W14	360	96	1.8	0.8
W15	360	96	1	0
W16	330	66	0.5	-0.5
W17	280	16	1	0
W18	290	26	0.4	-0.6
W19	300	36	1	0
W20	310	46	1.8	0.8
W21	320	56	1	0
W22	300	36	1.4	0.4
W23	280	16	0.8	-0.2
W24	300	36	1	0
W25	300	36	1	0
W26	330	66	1.8	0.8
W27	260	-4	1	0
W28	290	26	1	0
W29	270	6	2	1
W30	290	26	1.2	0.2
W31	340	76	1	0
W32	320	56	2	1
W33	300	36	1	0
W34	260	-4	1	0
W35	280	16	2	1
W36	280	16	2	1
W37	270	6	1.6	0.6
W38	260	-4	1.2	0.2
W39	240	-24	1	0
W40	260	-4	1	0
W41	280	16	1.4	0.4
W42	260	-4	2	1
W43	260	-4	1	0
W44	270	6	1	0
W45	280	16	0	-1

W46	300	36	1.2	0.2
W47	310	46	2	1
W48	300	36	3	2
W49	290	26	0	-1
W50	280	16	1	0
W51	280	16	2	1
W52	270	6	1	0
W53	280	16	2	1
W54	260	-4	1	0
W55	260	-4	2	1
W56	240	-24	1	0
W57	250	-14	1	0
W58	240	-24	1	0
W59	200	-64	0	-1
W60	220	-44	0.6	-0.4
W61	220	-44	0.6	-0.4
W62	250	-14	0	-1

All interior wall scans performed with Ludlum 2350-1 No.117014
with 43-106 No. 133866:

Scan MDA Beta - 620 dpm/detector area
Scan MDA Alpha - 45 dpm/detector area
Scan background Beta - 264 cpm
Scan background Alpha - 1 cpm
Detector Eff. Beta - .248
Detector Eff. Alpha - .211

Results of Surface Scans
Molycorp - Building 29 Survey Unit (Affected Area)

Building Interior Bathroom

Location (see map)	Beta Scan gross cpm	Beta Scan net cpm	Alpha Scan gross cpm	Alpha Scan net cpm
W1	300	36	2	1
W2	280	16	2	1
W3	340	76	2	1
W4	320	56	1	0
F1	350	86	2	1
C1	300	36	1	0
C2	280	16	1	0

All bathroom scans performed with Ludlum 2350-1 No.117014 with 43-106 No. 133866:

Scan MDA Beta - 620 dpm/detector area
Scan MDA Alpha - 45 dpm/detector area
Scan background Beta - 264 cpm
Scan background Alpha - 1 cpm
Detector Eff. Beta - .248
Detector Eff. Alpha - .211

Results of Surface Scans
Molycorp - Building 29 Survey Unit (Affected Area)

Building Ceiling (Interior)

Location (see map)	Beta Scan gross cpm	Beta Scan net cpm	Alpha Scan gross cpm	Alpha Scan net cpm
C1	260	-4	0	-1
C2	260	-4	0	-1
C3	280	16	1	0
C4	280	16	1	0
C5	280	16	1	0
C6	260	-4	0	-1
C7	290	26	0	-1
C8	270	6	1.4	0.4
C9	280	16	1	0
C10	270	6	1.2	0.2
C11	280	16	1	0
C12	260	-4	0	-1
C13	280	16	1.4	0.4
C14	290	26	1.6	0.6
C15	290	26	0	-1
C16	290	26	1	0
C17	280	16	2	1
C18	270	6	1	0
C19	270	6	1	0
C20	280	16	2.2	1.2
C21	270	6	1.2	0.2
C22	280	16	2	1
C23	280	16	2	1
C24	290	26	1	0

All ceiling scans performed with Ludlum 2350-1 No.117014 with 43 106 No. 133866:

Scan MDA Beta - 620 dpm/detector area
Scan MDA Alpha - 45 dpm/detector area
Scan background Beta - 264 cpm
Scan background Alpha - 1 cpm
Detector Eff. Beta - .248
Detector Eff. Alpha - .211

Results of Surface Scans
Molycorp - Building 29 Survey Unit (Affected Area)

Building Exterior (Walls)

Location (see map)	Beta Scan gross cpm	Beta Scan net cpm	Alpha Scan gross cpm	Alpha Scan net cpm
W1				
W2	340	76	1	0
W3				
W4				
W5				
W6	340	76	1.5	0.5
W7				
W8				
W9	300	36	4	3
W10				
W11				
W12				
W13	380	116	3	2
W14				
W15	280	16	4	3
W16				
W17				
W18				
W19				
W20				
W21	290	26	1	0
W22				
W23				
W24				
W25				
W26				
W27				
W28				
W29				
W30				

All exterior wall scans performed with Ludlum 2350-1 No.117014 with 43-106 No. 133866:

Scan MDA Beta - 620 dpm/detector area
Scan MDA Alpha - 45 dpm/detector area
Scan background Beta - 264 cpm
Scan background Alpha - 1 cpm
Detector Eff. Beta - .248
Detector Eff. Alpha - .211

Elevated Scan Readings
Molycorp - Building 29 Survey Unit (Affected Area)

Location	Beta Scan (net cpm)	Alpha Scan (net cpm)
F18	11030	19.6
F19	13530	53.6
F25		13.6
F26	10530	
F33	11530	77.6
F34	3530	15.6
F35		23.6
F50	18530	93.6
F57	8530	93.6
F58		19.6
F75	11530	13.6
F76	4530	
W9 (E)		3
W15 (E)		3

Locations F18, 19, 25, 26, 33, 34, 50, 57, 58, 75 and 76 have been remediated.

Direct Measurements (Total Activity)
Molycorp - Building 29 Survey Unit (Affected Area)

Building Floor (Interior)

Location	Unshield Beta cpm	Shield Beta cpm	Gross Beta cpm	Bkgd cpm	Net cpm	Direct Beta (dpm/100cm^2)	Uncertainty 95% CL	MDA (dpm/100cm^2)	Direct Alpha [1] (dpm/100cm^2)
F1	364	299	65	78	-13	-115	207	387	-230
F2	370	293	77	78	-1	-9	216	387	-18
F3	372	292	80	78	2	18	218	387	35
F4	350	260	90	78	12	106	225	387	212
F5	373	299	74	78	-4	-35	214	387	-71
F6	320	262	58	78	-20	-177	202	387	-354
F7	378	279	99	78	21	186	231	387	372
F8	377	299	78	78	0	0	217	387	0
F9	352	272	80	78	2	18	218	387	35
F10	370	289	81	78	3	27	219	387	53
F11	333	260	73	78	-5	-44	213	387	-88
F12	335	270	65	78	-13	-115	207	387	-230
F13	333	289	44	78	-34	-301	192	387	-602
F14	324	262	62	78	-16	-142	205	387	-283
F15	392	278	114	78	36	319	240	387	637
F16	348	242	106	78	28	318	302	497	636
F17	392	271	121	78	43	489	314	497	977
F18	742	333	409	78	331	3761	492	497	7523
F19	2711	464	2247	78	2169	24648	1074	497	49295
F20	269	209	60	78	-18	-205	262	497	-409
F21	327	269	58	78	-20	-227	260	497	-455
F22	335	285	50	78	-28	-318	252	497	-636
F23	357	265	92	78	14	159	290	497	318
F24	376	243	133	78	55	625	324	497	1250
F25	489	260	229	78	151	1716	390	497	3432
F26	2098	432	1666	78	1588	18045	930	497	36091
F27	337	259	78	78	0	0	278	497	0
F28	374	295	79	78	1	11	279	497	23
F29	384	238	146	78	68	773	333	497	1545
F30	392	298	94	78	16	182	292	497	364
F31	369	304	65	78	-13	-148	266	497	-295
F32	379	349	30	78	-48	-545	231	497	-1091
F33	8396	1061	7335	78	7257	82466	1918	497	164932
F34	609	272	337	78	259	2943	454	497	5886
F35	383	305	78	78	0	0	278	497	0
F36	402	298	104	78	26	295	300	497	591
F37	345	267	78	78	0	0	278	497	0
F38	435	308	127	78	49	557	319	497	1114
F39	404	359	45	78	-33	-375	247	497	-750
F40	388	231	157	78	79	898	341	497	1795
F41	389	239	150	78	72	818	336	497	1636
F42	315	252	63	78	-15	-170	264	497	-341
F43	370	272	98	78	20	227	295	497	455
F44	323	259	64	78	-14	-159	265	497	-318
F45	369	255	114	78	36	409	309	497	818
F46	353	239	114	78	36	409	309	497	818
F47	373	302	71	78	-7	-80	272	497	-159
F48	356	267	89	78	11	125	288	497	250
F49	378	270	108	78	30	341	304	497	682
F50	6194	595	5599	78	5521	62739	1678	497	125477
F51	330	234	96	78	18	205	294	497	409
F52	343	288	55	78	-23	-261	257	497	-523

F53	409	319	90	78	12	136	289	497	273
F54	413	326	87	78	9	102	286	497	205
F55	395	314	81	78	3	34	281	497	68
F56	363	295	68	78	-10	-114	269	497	-227
F57	1941	321	1620	78	1542	17523	918	497	35045
F58	729	359	370	78	292	3318	471	497	6636
F59	333	305	28	78	-50	-568	229	497	-1136
F60	337	270	67	78	-11	-125	268	497	-250
F61	365	248	117	78	39	443	311	497	886
F62	509	295	214	78	136	1545	381	497	3091
F63	413	300	113	78	35	398	308	497	795
F64	328	300	28	78	-50	-568	229	497	-1136
F65	317	291	26	78	-52	-591	227	497	-1182
F66	388	299	89	78	11	125	288	497	250
F67	318	273	45	78	-33	-375	247	497	-750
F68	378	280	98	78	20	227	295	497	455
F69	339	274	65	78	-13	-148	266	497	-295
F70	400	253	147	78	69	784	334	497	1568
F71	413	308	105	78	27	307	301	497	614
F72	361	288	73	78	-5	-57	274	497	-114
F73	431	315	116	78	38	432	310	497	864
F74	335	286	49	78	-29	-330	251	497	-659
F75	12621	754	11867	78	11789	133966	2434	497	267932
F76	6981	670	6311	78	6233	70830	1780	497	141659
F77	341	274	67	78	-11	-125	268	497	-250
F78	338	259	79	78	1	11	279	497	23
F79	318	268	50	78	-28	-318	252	497	-636
F80	331	273	58	78	-20	-227	260	497	-455
F81	341	265	76	78	-2	-23	276	497	-45
F82	406	284	122	78	44	500	315	497	1000
F83	414	305	109	78	31	352	305	497	705
F84	715	399	316	78	238	2705	442	497	5409
F85	453	311	142	78	64	727	330	497	1455
F86	435	310	125	78	47	534	317	497	1068
F87	319	282	37	78	-41	-466	239	497	-932

All other building interior floor direct measurements were performed with 2360 No. 156371and 43-89 No. 164832	Beta	Alpha
Floor Efficiency	0.088	0.153
Floor Background (cpm)	78	2.4
Floor MDA (dpm/100 cm^2)	497	65

F1-15 direct measurements were performed with 2360 No. 164680 and 43-89 No. 118544	Beta	Alpha
Floor Efficiency	0.113	0.164
Floor Background (cpm)	78	2.4
Floor MDA (dpm/100 cm^2)	387	60

(1) - A beta to alpha ratio factoring (1:2, beta to alpha) was used to provide a more accurate alpha activity determination then sampling.

Direct Measurements (Total Activity)
Molycorp - Building 29 Survey Unit (Affected Area)

Building Walls (Interior)

Location	Unshield Beta cpm	Shield Beta cpm	Gross Beta cpm	Bkgd cpm	Net cpm	Direct Beta (dpm/100cm^2)	Uncertainty 95% CL	MDA (dpm/100cm^2)	Direct Alpha [1] (dpm/100cm^2)
W1	328	310	18	8	10	88	88	140	177
W2	240	204	36	8	28	248	115	140	496
W3	212	191	21	8	13	115	93	140	230
W4	186	213	-27	8	-35	-310	76	140	-619
W5	227	202	25	8	17	150	100	140	301
W6	237	229	8	8	0	0	69	140	0
W7	195	214	-19	8	-27	-239	58	140	-478
W8	255	242	13	8	5	44	79	140	88
W9	243	239	4	8	-4	-35	60	140	-71
W10	282	244	38	8	30	265	118	140	531
W11	240	311	-71	8	-79	-699	138	140	-1398
W12	239	219	20	8	12	106	92	140	212
W13	291	301	-10	8	-18	-159	25	140	-319
W14	264	263	1	8	-7	-62	52	140	-124
W15	265	240	25	8	17	150	100	140	301
W16	284	231	53	8	45	398	135	140	796
W17	332	295	37	8	29	257	116	140	513
W18	261	243	18	8	10	88	88	140	177
W19	268	242	26	8	18	159	101	140	319
W20	208	191	17	8	9	80	87	140	159
W21	278	234	44	8	36	319	125	140	637
W22	230	232	-2	8	-10	-88	42	140	-177
W23	230	247	-17	8	-25	-221	52	140	-442
W24	385	300	85	8	77	681	167	140	1363
W25	641	326	315	8	307	2717	312	140	5434
W26	1400	729	671	8	663	5867	452	140	11735
W27	244	247	-3	8	-11	-97	39	140	-195
W28	229	205	24	8	16	142	98	140	283
W29	260	256	4	8	-4	-35	60	140	-71
W30	260	251	9	8	1	9	72	140	18
W31	226	206	20	8	12	106	92	140	212
W32	222	208	14	8	6	53	81	140	106
W33	255	234	21	8	13	115	93	140	230
W34	212	175	37	8	29	257	116	140	513
W35	286	253	33	8	25	221	111	140	442
W36	300	251	49	8	41	363	131	140	726
W37	215	202	13	8	5	44	79	140	88
W38	234	222	12	8	4	35	78	140	71
W39	182	181	1	8	-7	-62	52	140	-124
W40	187	160	27	8	19	168	103	140	336
W41	226	180	46	8	38	336	127	140	673
W42	254	208	46	8	38	336	127	140	673
W43	212	171	41	8	33	292	121	140	584
W44	212	184	28	8	20	177	104	140	354
W45	220	192	28	8	20	177	104	140	354
W46	199	212	-13	8	-21	-186	39	140	-372
W47	220	216	4	8	-4	-35	60	140	-71
W48	219	239	-20	8	-28	-248	60	140	-496
W49	251	228	23	8	15	133	97	140	265
W50	220	211	9	8	1	9	72	140	18
W51	270	233	37	8	29	257	116	140	513
W52	240	196	44	8	36	319	125	140	637

W53	215	225	-10	8	-18	-159	25	140	-319
W54	218	211	7	8	-1	-9	67	140	-18
W55	209	200	9	8	1	9	72	140	18
W56	199	163	36	8	28	248	115	140	496
W57	163	185	-22	8	-30	-265	65	140	-531
W58	181	174	7	8	-1	-9	67	140	-18
W59	221	235	-14	8	-22	-195	42	140	-389
W60	196	209	-13	8	-21	-186	39	140	-372
W61	216	220	-4	8	-12	-106	35	140	-212
W62	208	247	-39	8	-47	-416	97	140	-832

All building interior wall direct measurements were performed with 2360

No. 164680 and 43-89 No. 118544	Beta	Alpha
Wall Efficiency	0.113	0.164
Wall Background (cpm)	8	3.7
Wall MDA (dpm/100 cm^2)	140	71

(1) - A beta to alpha ratio factoring (1:2, beta to alpha) was used to provide a more accurate alpha activity determination then sampling.

Direct Measurements (Total Activity)
Molycorp - Building 29 Survey Unit (Affected Area)

Building Ceiling (Interior)

Location	Unshield Beta cpm	Shield Beta cpm	Gross Beta cpm	Bkgd cpm	Net cpm	Direct Beta (dpm/100cm^2)	Uncertainty 95% CL	MDA (dpm/100cm^2)	Direct Alpha [1] (dpm/100cm^2)
C1	251	220	31	8	23	204	108	140	407
C2	246	211	35	8	27	239	114	140	478
C3	201	262	-61	8	-69	-611	126	140	-1221
C4	254	266	-12	8	-20	-177	35	140	-354
C5	217	225	-8	8	-16	-142	0	140	-283
C6	228	253	-25	8	-33	-292	72	140	-584
C7	213	229	-16	8	-24	-212	49	140	-425
C8	241	216	25	8	17	150	100	140	301
C9	232	221	11	8	3	27	76	140	53
C10	230	206	24	8	16	142	98	140	283
C11	213	235	-22	8	-30	-265	65	140	-531
C12	219	240	-21	8	-29	-257	63	140	-513
C13	237	217	20	8	12	106	92	140	212
C14	233	251	-18	8	-26	-230	55	140	-460
C15	266	248	18	8	10	88	88	140	177
C16	239	270	-31	8	-39	-345	83	140	-690
C17	252	237	15	8	7	62	83	140	124
C18	267	246	21	8	13	115	93	140	230
C19	265	234	31	8	23	204	108	140	407
C20	246	229	17	8	9	80	87	140	159
C21	260	244	16	8	8	71	85	140	142
C22	285	249	36	8	28	248	115	140	496
C23	267	271	-4	8	-12	-106	35	140	-212
C24	260	266	-6	8	-14	-124	25	140	-248

All ceiling direct measurements were performed with 2360 No. 156371 and 43-89 No. 164832

	Beta	Alpha
Ceiling Efficiency	0.113	0.164
Ceiling Background (cpm)	8	3.7
Ceiling MDA (dpm/100 cm^2)	140	71

(1) - A beta to alpha ratio factoring (1:2, beta to alpha) was used to provide a more accurate alpha activity determination then sampling.

Direct Measurements (Total Activity)
Molycorp - Building 29 Survey Unit (Affected Area)

Building Interior Bathroom

Location	Unshield Beta cpm	Shield Beta cpm	Gross Beta cpm	Bkgd cpm	Net cpm	Direct Beta (dpm/100cm^2)	Uncertainty 95% CL	MDA (dpm/100cm^2)	Direct Alpha [1] (dpm/100cm^2)
W1	181	182	-1	8	-9	-80	46	140	-159
W2	258	243	15	8	7	62	83	140	124
W3	297	270	27	8	19	168	103	140	336
W4	221	201	20	8	12	106	92	140	212
C1	272	242	30	8	22	195	107	140	389
C2	223	210	13	8	5	44	79	140	88
F1	404	287	117	78	39	345	242	387	690

All bathroom wall and ceiling direct measurements were performed with 2360 No. 164680 and 43-89 No. 118544

	Beta	Alpha
Efficiency	0.113	0.164
Background (cpm)	8	3.7
MDA (dpm/100 cm^2)	140	71

F1 direct measurement was performed with 2360 No. 164680 and 43-89 No. 118544

	Beta	Alpha
Floor Efficiency	0.113	0.164
Floor Background (cpm)	78	2.4
Floor MDA (dpm/100 cm^2)	387	60

(1) - A beta to alpha ratio factoring (1:2, beta to alpha) was used to provide a more accurate alpha activity determination then sampling.

Direct Measurements (Total Activity)
Molycorp - Building 29 Survey Unit (Affected Area)

Building Exterior (Walls and Vents)

Location	Unshield Beta cpm	Shield Beta cpm	Gross Beta cpm	Bkgd cpm	Net cpm	Direct Beta (dpm/100cm^2)	Uncertainty 95% CL	MDA (dpm/100cm^2)	Direct Alpha [1] (dpm/100cm^2)
W1	228	198	30	8	22	195	107	140	389
W2	214	225	-11	8	-19	-168	30	140	-336
W3	240	205	35	8	27	239	114	140	478
W4	319	299	20	8	12	106	92	140	212
W5	286	284	2	8	-6	-53	55	140	-106
W6	277	265	12	8	4	35	78	140	71
W7	286	259	27	8	19	168	103	140	336
W8	328	274	54	8	46	407	137	140	814
W9	258	260	-2	8	-10	-88	42	140	-177
W10	269	237	32	8	24	212	110	140	425
W11	262	249	13	8	5	44	79	140	88
W12	256	253	3	8	-5	-44	58	140	-88
W13	293	300	-7	8	-15	-133	17	140	-265
W14	265	256	9	8	1	9	72	140	18
W15	228	234	-6	8	-14	-124	25	140	-248
W16	231	200	31	8	23	204	108	140	407
W17	233	209	24	8	16	142	98	140	283
W18	243	224	19	8	11	97	90	140	195
W19	195	196	-1	8	-9	-80	46	140	-159
W20	244	220	24	8	16	142	98	140	283
W21	227	220	7	8	-1	-9	67	140	-18
W22	183	180	3	8	-5	-44	58	140	-88
W23	198	163	35	8	27	239	114	140	478
W24	195	197	-2	8	-10	-88	42	140	-177
W25	193	186	7	8	-1	-9	67	140	-18
W26	210	181	29	8	21	186	106	140	372
W27	250	253	-3	8	-11	-97	39	140	-195
W28	227	181	46	8	38	336	127	140	673
W29	184	185	-1	8	-9	-80	46	140	-159
W30	152	191	-39	8	-47	-416	97	140	-832
V1	238	230	8	8	0	0	69	140	0

All building exterior direct measurements were performed with 2360 No. 156371 and 43-89 No. 164832

	Beta	Alpha
Efficiency	0.113	0.164
Background (cpm)	8	3.7
MDA (dpm/100 cm^2)	140	71

(1) - A beta to alpha ratio factoring (1:2, beta to alpha) was used to provide a more accurate alpha activity determination then sampling.

Direct Measurements (Total Activity)
Molycorp - Building 29 Survey Unit (Affected Area)

Building Floor (Interior) After Remeidal Activities

Location	Unshield Beta cpm	Shield Beta cpm	Gross Beta cpm	Bkgd cpm	Net cpm	Direct Beta (dpm/100cm^2)	Uncertainty 95% CL	MDA (dpm/100cm^2)	Direct Alpha [1] (dpm/100cm^2)
F18	330	229	101	78	23	250	285	476	500
F18	425	251	174	78	96	1043	338	476	2087
F19	313	280	33	78	-45	-489	224	476	-978
F19	368	273	95	78	17	185	280	476	370
F24	330	290	40	78	-38	-413	231	476	-826
F25	332	258	74	78	-4	-43	263	476	-87
F26	338	291	47	78	-31	-337	238	476	-674
F26	360	253	107	78	29	315	290	476	630
F29	354	293	61	78	-17	-185	251	476	-370
F33	347	271	76	78	-2	-22	264	476	-43
F33	289	235	54	78	-24	-261	245	476	-522
F34	340	294	46	78	-32	-348	237	476	-696
F38	366	259	107	78	29	315	290	476	630
F40	358	279	79	78	1	11	267	476	22
F41	312	274	38	78	-40	-435	229	476	-870
F50	361	309	52	78	-26	-283	243	476	-565
F50	372	308	64	78	-14	-152	254	476	-304
F57	421	306	115	78	37	402	296	476	804
F57	355	323	32	78	-46	-500	223	476	-1000
F58	380	284	96	78	18	196	281	476	391
F62	388	309	79	78	1	11	267	476	22
F70	391	294	97	78	19	207	282	476	413
F71	392	337	55	78	-23	-250	246	476	-500
F75	323	293	30	78	-48	-522	221	476	-1043
F76	336	303	33	78	-45	-489	224	476	-978
F83	311	261	50	78	-28	-304	241	476	-609
F84	328	256	72	78	-6	-65	261	476	-130
F85	319	248	71	78	-7	-76	260	476	-152
F86	354	300	54	78	-24	-261	245	476	-522

After remediation, building interior floor direct measurements were performed with 2224-1 No. 129463 and 43-89 No. 169230

	Beta	Alpha
Floor Efficiency	0.092	0.154
Floor Background (cpm)	78	2.4
Floor MDA (dpm/100 cm^2)	476	66

Elevated Direct Measurements (Total Activity) and Averaging Results
Molycorp - Building 29 Survey Unit (Affected Area)

Location	Direct Beta (dpm/100cm^2)	Direct Alpha [1] (dpm/100cm^2)	Over Area (cm^2)	Exceeds Limits Maximum	Exceeds Limits Average	Average Value (over 1 m^2)	Within Limits? Yes/No
F18	3761	7523					
F19	24648	49295					
F24		1250					
F25	1716	3432					
F26	18045	36091					
F29		1545					
F33	82466	164932					
F34	2943	5886					
F38		1114					
F40		1795					
F41		1636					
F50	62739	125477					
F57	17523	35045					
F58	3318	6636					
F62	1545	3091					
F70		1568					
F75	133966	267932					
F76	70830	141659					
F84	2705	5409					
F85		1455					
F86		1068					
W24 (I)		1363					
W25 (I)	2717	5434					
W26 (I)	5867	11735					
F18*	1043	2086	100	No	Yes	-325	Yes

All elevated direct readings located on the floor have been remediated.
*F18 averaged after remediation.

All elevated direct readings located on the interior wall structures (purloins) have been marked and identified for removal prior to building demolition.

Removable Surface Activity Measurements
Molycorp - Building 29 Survey Unit (Affected Area)

Building Floor

Location (see map)	Removable Beta (dpm/100cm2)	Uncertainty 95% CL	MDA	Removable Alpha (dpm/100cm2)	Uncertainty 95% CL	MDA	Instrument #
F1	-42	32.9	153	-0.2	1.5	12	2
F2	0	10.3	153	2.7	5.5	12	2
F3	12	19.6	153	-0.2	1.5	12	2
F4	-30	28.4	153	-0.2	1.5	12	2
F5	0	10.3	153	2.7	5.5	12	2
F6	48	35.0	153	-0.2	1.5	12	2
F7	-6	15.7	153	-0.2	1.5	12	2
F8	6	15.7	153	-0.2	1.5	12	2
F9	-48	35.0	153	-0.2	1.5	12	2
F10	-24	25.8	153	-0.2	1.5	12	2
F11	-6	15.7	153	-0.2	1.5	12	2
F12	-48	35.0	153	-0.2	1.5	12	2
F13	6	15.7	153	-0.2	1.5	12	2
F14	-272	80.2	153	-0.2	1.5	12	2
F15	-48	35.0	153	-0.2	1.5	12	2
F16	54	36.9	153	2.7	5.5	12	2
F17	12	19.6	153	-0.2	1.5	12	2
F18	30	28.4	153	-0.2	1.5	12	2
F19	-48	35.0	153	-0.2	1.5	12	2
F20	0	10.3	153	-0.2	1.5	12	2
F21	18	22.9	153	2.7	5.5	12	2
F22	-18	22.9	153	2.7	5.5	12	2
F23	48	35.0	153	2.7	5.5	12	2
F24	-42	32.9	153	-0.2	1.5	12	2
F25	-18	22.9	153	2.7	5.5	12	2
F26	0	10.3	153	-0.2	1.5	12	2
F27	6	15.7	153	-0.2	1.5	12	2
F28	-36	30.7	153	-0.2	1.5	12	2
F29	-272	80.2	153	-0.2	1.5	12	2
F30	12	19.6	153	-0.2	1.5	12	2
F31	42	32.9	153	-0.2	1.5	12	2
F32	-72	42.2	153	-0.2	1.5	12	2
F33	90	46.9	153	2.7	5.5	12	2
F34	-54	36.9	153	-0.2	1.5	12	2
F35	12	19.6	153	-0.2	1.5	12	2
F36	18	22.9	153	-0.2	1.5	12	2
F37	-18	22.9	153	-0.2	1.5	12	2
F38	36	30.7	153	-0.2	1.5	12	2
F39	-12	19.6	153	-0.2	1.5	12	2
F40	48	35.0	153	2.7	5.5	12	2
F41	12	19.6	153	2.7	5.5	12	2
F42	-36	30.7	153	-0.2	1.5	12	2
F43	-18	22.9	153	-0.2	1.5	12	2
F44	6	15.7	153	-0.2	1.5	12	2
F45	-24	25.8	153	-0.2	1.5	12	2
F46	42	32.9	153	-0.2	1.5	12	2
F47	30	28.4	153	-0.2	1.5	12	2
F48	-272	80.2	153	-0.2	1.5	12	2
F49	-36	30.7	153	-0.2	1.5	12	2
F50	-60	38.8	153	2.7	5.5	12	2
F51	-272	80.2	153	-0.2	1.5	12	2
F52	24	25.8	153	-0.2	1.5	12	2

F53	48	35.0	153	-0.2	1.5	12	2
F54	-272	80.2	153	-0.2	1.5	12	2
F55	30	28.4	153	2.7	5.5	12	2
F56	24	25.8	153	2.7	5.5	12	2
F57	18	22.9	153	-0.2	1.5	12	2
F58	-272	80.2	153	-0.2	1.5	12	2
F59	24	25.8	153	-0.2	1.5	12	2
F60	-272	80.2	153	-0.2	1.5	12	2
F61	36	30.7	153	-0.2	1.5	12	2
F62	-272	80.2	153	-0.2	1.5	12	2
F63	24	25.8	153	-0.2	1.5	12	2
F64	48	35.0	153	2.7	5.5	12	2
F65	-272	80.2	153	-0.2	1.5	12	2
F66	6	15.7	153	-0.2	1.5	12	2
F67	-272	80.2	153	-0.2	1.5	12	2
F68	18	22.9	153	-0.2	1.5	12	2
F69	30	28.4	153	-0.2	1.5	12	2
F70	54	36.9	153	2.7	5.5	12	2
F71	24	25.8	153	-0.2	1.5	12	2
F72	-272	80.2	153	-0.2	1.5	12	2
F73	-272	80.2	153	-0.2	1.5	12	2
F74	-272	80.2	153	-0.2	1.5	12	2
F75	0	10.3	153	-0.2	1.5	12	2
F76	6	15.7	153	2.7	5.5	12	2
F77	-272	80.2	153	-0.2	1.5	12	2
F78	0	10.3	153	-0.2	1.5	12	2
F79	0	10.3	153	-0.2	1.5	12	2
F80	0	10.3	153	-0.2	1.5	12	2
F81	78	43.8	153	-0.2	1.5	12	2
F82	24	25.8	153	2.7	5.5	12	2
F83	-84	45.4	153	-0.2	1.5	12	2
F84	-272	80.2	153	-0.2	1.5	12	2
F85	-90	46.9	153	-0.2	1.5	12	2
F86	-272	80.2	153	-0.2	1.5	12	2
F87	-272	80.2	153	-0.2	1.5	12	2

#2 - Ludlum 2929 No. 152202 with 43-10 No. 156519 Info (3-26):

	Beta	Alpha
Background (cpm)	45	0.07
Bkgd ct. time	60	60
Sample ct. time	1	1
Efficiency	0.165	0.344
MDA	153	12.0

Removable Surface Activity Measurements
Molycorp - Building 29 Survey Unit (Affected Area)

Building Walls (Interior)

Location (see map)	Removable Beta (dpm/100cm2)	Uncertainty 95% CL	MDA	Removable Alpha (dpm/100cm2)	Uncertainty 95% CL	MDA	Instrument #
W1	-6	15.5	150	-1.0	3.4	12	1
W2	0	10.1	150	-1.0	3.4	12	1
W3	30	28.3	150	-1.0	3.4	12	1
W4	48	34.9	150	-1.0	3.4	12	1
W5	12	19.5	150	-1.0	3.4	12	1
W6	0	10.1	150	-1.0	3.4	12	1
W7	61	39.0	150	-1.0	3.4	12	1
W8	-12	19.5	150	1.9	4.6	12	1
W9	0	10.1	150	-1.0	3.4	12	1
W10	-6	15.5	150	-1.0	3.4	12	1
W11	24	25.7	150	-1.0	3.4	12	1
W12	18	22.8	150	-1.0	3.4	12	1
W13	-42	32.8	150	-1.0	3.4	12	1
W14	-24	25.7	150	1.9	4.6	12	1
W15	-55	37.2	150	-1.0	3.4	12	1
W16	79	44.1	150	-1.0	3.4	12	1
W17	85	45.6	150	-1.0	3.4	12	1
W18	0	10.1	150	-1.0	3.4	12	1
W19	18	22.8	150	-1.0	3.4	12	1
W20	-60	38.7	150	-1.0	3.4	12	1
W21	18	22.8	150	-1.0	3.4	12	1
W22	-18	22.8	150	1.9	4.6	12	1
W23	36	30.6	150	-1.0	3.4	12	1
W24	18	22.8	150	4.8	7.3	12	1
W25	36	30.6	150	-1.0	3.4	12	1
W26	67	40.8	150	-1.0	3.4	12	1
W27	-54	36.9	150	-1.0	3.4	12	1
W28	-24	25.7	150	-1.0	3.4	12	1
W29	0	10.1	150	-1.0	3.4	12	1
W30	-18	22.8	150	-1.0	3.4	12	1
W31	24	25.7	150	1.9	4.6	12	1
W32	-49	35.2	150	1.9	4.6	12	1
W33	97	48.6	150	-1.0	3.4	12	1
W34	-18	22.8	150	-1.0	3.4	12	1
W35	60	38.7	150	-1.0	3.4	12	1
W36	0	10.1	150	1.9	4.6	12	1
W37	-18	22.8	150	-1.0	3.4	12	1
W38	6	15.5	150	1.9	4.6	12	1
W39	-30	28.4	153	-0.17	1.4	14.5	2
W40	-48	35.0	153	2.7	5.5	14.5	2
W41	-36	30.8	153	2.7	5.5	14.5	2
W42	-6	15.7	153	2.7	5.5	14.5	2
W43	48	35.0	153	-0.17	1.4	14.5	2
W44	18	23.0	153	-0.17	1.4	14.5	2
W45	72	42.2	153	-0.17	1.4	14.5	2
W46	24	25.8	153	-0.17	1.4	14.5	2

W47	30	28.4	153	2.7	5.5	14.5	2
W48	-24	25.8	153	-0.17	1.4	14.5	2
W49	-36	30.8	153	2.7	5.5	14.5	2
W50	18	23.0	153	2.7	5.5	14.5	2
W51	-6	15.7	153	-0.17	1.4	14.5	2
W52	-24	25.8	153	-0.17	1.4	14.5	2
W53	18	23.0	153	-0.17	1.4	14.5	2
W54	-24	25.8	153	-0.17	1.4	14.5	2
W55	18	23.0	153	-0.17	1.4	14.5	2
W56	-6	15.7	153	-0.17	1.4	14.5	2
W57	-24	25.8	153	-0.17	1.4	14.5	2
W58	-36	30.8	153	2.7	5.5	14.5	2
W59	42	33.0	153	-0.17	1.4	14.5	2
W60	30	28.4	153	-0.17	1.4	14.5	2
W61	0	10.4	153	2.7	5.5	14.5	2
W62	-6	15.7	153	-0.17	1.4	14.5	2

#1 - Ludlum 2929 No. 152202 with 43-10 No. 156519 Info (3-25):

	Beta	Alpha
Background (cpm)	43	0.36
Bkgd ct. time	60	60
Sample ct. time	1	1
Efficiency	0.165	0.344
MDA	150	14.5

#2 - Ludlum 2929 No. 152202 with 43-10 No. 156519 Info (3-26):

	Beta	Alpha
Background (cpm)	46	0.07
Bkgd ct. time	60	60
Sample ct. time	1	1
Efficiency	0.165	0.344
MDA	153	12.0

Removable Surface Activity Measurements
Molycorp - Building 29 Survey Unit (Affected Area)

Building Floor

Location (see map)	Removable Beta (dpm/100cm2)	Uncertainty 95% CL	MDA	Removable Alpha (dpm/100cm2)	Uncertainty 95% CL	MDA	Instrument #
F1	-42	32.9	153	-0.2	1.5	12	2
F2	0	10.3	153	2.7	5.5	12	2
F3	12	19.6	153	-0.2	1.5	12	2
F4	-30	28.4	153	-0.2	1.5	12	2
F5	0	10.3	153	2.7	5.5	12	2
F6	48	35.0	153	-0.2	1.5	12	2
F7	-6	15.7	153	-0.2	1.5	12	2
F8	6	15.7	153	-0.2	1.5	12	2
F9	-48	35.0	153	-0.2	1.5	12	2
F10	-24	25.8	153	-0.2	1.5	12	2
F11	-6	15.7	153	-0.2	1.5	12	2
F12	-48	35.0	153	-0.2	1.5	12	2
F13	6	15.7	153	-0.2	1.5	12	2
F14	-272	80.2	153	-0.2	1.5	12	2
F15	-48	35.0	153	-0.2	1.5	12	2
F16	54	36.9	153	2.7	5.5	12	2
F17	12	19.6	153	-0.2	1.5	12	2
F18	30	28.4	153	-0.2	1.5	12	2
F19	-48	35.0	153	-0.2	1.5	12	2
F20	0	10.3	153	-0.2	1.5	12	2
F21	18	22.9	153	2.7	5.5	12	2
F22	-18	22.9	153	2.7	5.5	12	2
F23	48	35.0	153	2.7	5.5	12	2
F24	-42	32.9	153	-0.2	1.5	12	2
F25	-18	22.9	153	2.7	5.5	12	2
F26	0	10.3	153	-0.2	1.5	12	2
F27	6	15.7	153	-0.2	1.5	12	2
F28	-36	30.7	153	-0.2	1.5	12	2
F29	-272	80.2	153	-0.2	1.5	12	2
F30	12	19.6	153	-0.2	1.5	12	2
F31	42	32.9	153	-0.2	1.5	12	2
F32	-72	42.2	153	-0.2	1.5	12	2
F33	90	46.9	153	2.7	5.5	12	2
F34	-54	36.9	153	-0.2	1.5	12	2
F35	12	19.6	153	-0.2	1.5	12	2
F36	18	22.9	153	-0.2	1.5	12	2
F37	-18	22.9	153	-0.2	1.5	12	2
F38	36	30.7	153	-0.2	1.5	12	2
F39	-12	19.6	153	-0.2	1.5	12	2
F40	48	35.0	153	2.7	5.5	12	2
F41	12	19.6	153	2.7	5.5	12	2
F42	-36	30.7	153	-0.2	1.5	12	2
F43	-18	22.9	153	-0.2	1.5	12	2
F44	6	15.7	153	-0.2	1.5	12	2
F45	-24	25.8	153	-0.2	1.5	12	2
F46	42	32.9	153	-0.2	1.5	12	2

F47	30	28.4	153	-0.2	1.5	12	2
F48	-272	80.2	153	-0.2	1.5	12	2
F49	-36	30.7	153	-0.2	1.5	12	2
F50	-60	38.8	153	2.7	5.5	12	2
F51	-272	80.2	153	-0.2	1.5	12	2
F52	24	25.8	153	-0.2	1.5	12	2
F53	48	35.0	153	-0.2	1.5	12	2
F54	-272	80.2	153	-0.2	1.5	12	2
F55	30	28.4	153	2.7	5.5	12	2
F56	24	25.8	153	2.7	5.5	12	2
F57	18	22.9	153	-0.2	1.5	12	2
F58	-272	80.2	153	-0.2	1.5	12	2
F59	24	25.8	153	-0.2	1.5	12	2
F60	-272	80.2	153	-0.2	1.5	12	2
F61	36	30.7	153	-0.2	1.5	12	2
F62	-272	80.2	153	-0.2	1.5	12	2
F63	24	25.8	153	-0.2	1.5	12	2
F64	48	35.0	153	2.7	5.5	12	2
F65	-272	80.2	153	-0.2	1.5	12	2
F66	6	15.7	153	-0.2	1.5	12	2
F67	-272	80.2	153	-0.2	1.5	12	2
F68	18	22.9	153	-0.2	1.5	12	2
F69	30	28.4	153	-0.2	1.5	12	2
F70	54	36.9	153	2.7	5.5	12	2
F71	24	25.8	153	-0.2	1.5	12	2
F72	-272	80.2	153	-0.2	1.5	12	2
F73	-272	80.2	153	-0.2	1.5	12	2
F74	-272	80.2	153	-0.2	1.5	12	2
F75	0	10.3	153	-0.2	1.5	12	2
F76	6	15.7	153	2.7	5.5	12	2
F77	-272	80.2	153	-0.2	1.5	12	2
F78	0	10.3	153	-0.2	1.5	12	2
F79	0	10.3	153	-0.2	1.5	12	2
F80	0	10.3	153	-0.2	1.5	12	2
F81	78	43.8	153	-0.2	1.5	12	2
F82	24	25.8	153	2.7	5.5	12	2
F83	-84	45.4	153	-0.2	1.5	12	2
F84	-272	80.2	153	-0.2	1.5	12	2
F85	-90	46.9	153	-0.2	1.5	12	2
F86	-272	80.2	153	-0.2	1.5	12	2
F87	-272	80.2	153	-0.2	1.5	12	2

#2 - Ludlum 2929 No. 152202 with 43-10
No. 156519 Info (3-26):

	Beta	Alpha
Background (cpm)	45	0.07
Bkgd ct. time	60	60
Sample ct. time	1	1
Efficiency	0.165	0.344
MDA	153	12.0

Removable Surface Activity Measurements
Molycorp - Building 29 Survey Unit (Affected Area)

Building Bathroom

Location (see map)	Removable Beta (dpm/100cm2)	Uncertainty 95% CL	MDA	Removable Alpha (dpm/100cm2)	Uncertainty 95% CL	MDA	Instrument #
W1	-12	19.7	154	2.5	5.3	12.2	3
W2	-12	19.7	154	-0.4	2.1	12.2	3
W3	12	19.7	154	-0.4	2.1	12.2	3
W4	12	19.7	154	2.5	5.3	12.2	3
F1	100	49.4	154	5.4	7.8	12.2	3
C1	38	31.5	154	-0.5	2.4	12.2	3
C2	12	19.7	154	2.5	5.3	12.2	3

#3 - Ludlum 2929 No. 152202 with 43-10 No. 156519 Info:

	Beta	Alpha
Background (cpm)	46	0.13
Bkgd ct. time	60	60
Sample ct. time	1	1
Efficiency	0.165	0.344
MDA	154	12.2

Removable Surface Activity Measurements
Molycorp - Building 29 Survey Unit (Affected Area)

Building Ceiling (Interior)

Location (see map)	Removable Beta (dpm/100cm2)	Uncertainty 95% CL	MDA	Removable Alpha (dpm/100cm2)	Uncertainty 95% CL	MDA	Instrument #
C1	-6	15.7	153	-0.17	1.4	12	2
C2	24	25.8	153	2.7	5.5	12	2
C3	-78	43.9	153	2.7	5.5	12	2
C4	-36	30.8	153	2.7	5.5	12	2
C5	-24	25.8	153	-0.17	1.4	12	2
C6	18	23.0	153	-0.17	1.4	12	2
C7	-6	15.7	153	-0.17	1.4	12	2
C8	18	23.0	153	-0.17	1.4	12	2
C9	-24	25.8	153	-0.17	1.4	12	2
C10	18	23.0	153	-0.17	1.4	12	2
C11	-36	30.8	153	-0.17	1.4	12	2
C12	-42	33.0	153	2.7	5.5	12	2
C13	-6	15.7	153	-0.17	1.4	12	2
C14	-48	35.0	153	-0.17	1.4	12	2
C15	-18	23.0	153	-0.17	1.4	12	2
C16	-6	15.7	153	2.7	5.5	12	2
C17	6	15.7	153	2.7	5.5	12	2
C18	18	23.0	153	-0.17	1.4	12	2
C19	30	28.4	153	-0.17	1.4	12	2
C20	12	19.7	153	2.7	5.5	12	2
C21	-36	30.8	153	2.7	5.5	12	2
C22	-24	25.8	153	-0.17	1.4	12	2
C23	12	19.7	153	2.7	5.5	12	2
C24	6	15.7	153	-0.17	1.4	12	2

#2 - Ludlum 2929 No. 152202 with 43-10
No. 156519 Info (4-1):

	Beta	Alpha
Background (cpm)	46	0.07
Bkgd ct. time	60	60
Sample ct. time	1	1
Efficiency	0.165	0.344
MDA	153	12.0

Removable Surface Activity Measurements
Molycorp - Building 29 Survey Unit (Affected Area)

Building Exterior (Walls and Vents)

Location (see map)	Removable Beta (dpm/100cm2)	Uncertainty 95% CL	MDA	Removable Alpha (dpm/100cm2)	Uncertainty 95% CL	MDA	Instrument #
W1	-54	37.0	154	-0.4	2.1	12	3
W2	48	35.0	154	-0.4	2.1	12	3
W3	30	28.4	154	-0.4	2.1	12	3
W4	18	23.0	154	-0.4	2.1	12	3
W5	54	37.0	154	-0.4	2.1	12	3
W6	-66	40.6	154	2.5	5.3	12	3
W7	-60	38.8	154	-0.4	2.1	12	3
W8	24	25.8	154	2.5	5.3	12	3
W9	-54	37.0	154	-0.4	2.1	12	3
W10	60	38.8	154	-0.4	2.1	12	3
W11	-18	23.0	154	-0.4	2.1	12	3
W12	-85	45.7	154	-0.4	2.1	12	3
W13	18	23.0	154	-0.4	2.1	12	3
W14	30	28.4	154	2.5	5.3	12	3
W15	18	23.0	154	2.5	5.3	12	3
W16	-24	25.8	154	-0.4	2.1	12	3
W17	-42	33.0	154	2.5	5.3	12	3
W18	0	10.4	154	-0.4	2.1	12	3
W19	18	23.0	154	-0.4	2.1	12	3
W20	-18	23.0	154	-0.4	2.1	12	3
W21	60	38.8	154	-0.4	2.1	12	3
W22	-60	38.8	154	-0.4	2.1	12	3
W23	30	28.4	154	-0.4	2.1	12	3
W24	18	23.0	154	-0.4	2.1	12	3
W25	-66	40.6	154	-0.4	2.1	12	3
W26	-54	37.0	154	-0.4	2.1	12	3
W27	-18	23.0	154	-0.4	2.1	12	3
W28	30	28.4	154	-0.4	2.1	12	3
W29	-42	33.0	154	-0.4	2.1	12	3
W30	-18	23.0	154	-0.4	2.1	12	3
V1	-12	19.7	154	-0.4	2.1	12	3

#3 - Ludlum 2929 No. 152202 with 43-10
No. 156519 Info:

	Beta	Alpha
Background (cpm)	46	0.13
Bkgd ct. time	60	60
Sample ct. time	1	1
Efficiency	0.165	0.344
MDA	154	12.2

Elevated Removable Surface Activity Measurements
Molycorp - Building 29 Survey Unit (Affected Area)

No elevated removable surface activity was reported above limits.

Exposure Rate Measurements
Molycorp - Building 29 Survey Unit (Affected Area)

Building Floor

Location	Exposure Rate (uR/hr)	Net Exp Rate (uR/hr)	Location	Exposure Rate (uR/hr)	Net Exp Rate (uR/hr)
F1	8	-2	F45	10	0
F2	12	2	F46	10	0
F3	10	0	F47	11	1
F4	10	0	F48	11	1
F5	10	0	F49	10	0
F6	10	0	F50	10	0
F7	12	2	F51	11	1
F8	12	2	F52	10	0
F9	12	2	F53	10	0
F10	10	0	F54	10	0
F11	10	0	F55	10	0
F12	10	0	F56	11	1
F13	10	0	F57	10	0
F14	10	0	F58	10	0
F15	10	0	F59	10	0
F16	10	0	F60	11	1
F17	10	0	F61	10	0
F18	10	0	F62	11	1
F19	10	0	F63	11	1
F20	10	0	F64	10	0
F21	11	1	F65	10	0
F22	11	1	F66	10	0
F23	12	2	F67	10	0
F24	11	1	F68	10	0
F25	10	0	F69	10	0
F26	10	0	F70	10	0
F27	10	0	F71	11	1
F28	10	0	F72	11	1
F29	10	0	F73	10	0
F30	10	0	F74	10	0
F31	9	-1	F75	11	1
F32	10	0	F76	10	0
F33	10	0	F77	10	0
F34	10	0	F78	12	2
F35	10	0	F79	10	0
F36	10	0	F80	10	0
F37	10	0	F81	12	2
F38	10	0	F82	12	2
F39	9	-1	F83	12	2
F40	11	1	F84	14	4
F41	10	0	F85	12	2
F42	10	0	F86	12	2
F43	10	0	F87	10	0
F44	10	0			

Background dose rate: 10 uR/hr with Model 19, No.115870

Exposure Rate Measurements
Molycorp - Building 29 Survey Unit (Affected Area)

Building Walls (Interior)

Location	Exposure Rate (uR/hr)	Net Exp Rate (uR/hr)	Location	Exposure Rate (uR/hr)	Net Exp Rate (uR/hr)
W1	8	-2	W32	10	0
W2	12	2	W33	10	0
W3	10	0	W34	10	0
W4	10	0	W35	10	0
W5	12	2	W36	10	0
W6	12	2	W37	10	0
W7	10	0	W38	10	0
W8	10	0	W39	5	-5
W9	10	0	W40	6	-4
W10	10	0	W41	7	-3
W11	10	0	W42	7	-3
W12	10	0	W43	7	-3
W13	10	0	W44	7	-3
W14	10	0	W45	7	-3
W15	10	0	W46	7	-3
W16	10	0	W47	7	-3
W17	10	0	W48	8	-2
W18	10	0	W49	8	-2
W19	10	0	W50	8	-2
W20	12	2	W51	8	-2
W21	10	0	W52	8	-2
W22	12	2	W53	8	-2
W23	12	2	W54	7	-3
W24	14	4	W55	8	-2
W25	14	4	W56	8	-2
W26	12	2	W57	7	-3
W27	10	0	W58	7	-3
W28	10	0	W59	10	0
W29	10	0	W60	10	0
W30	10	0	W61	10	0
W31	10	0	W62	10	0

Background dose rate: 10 uR/hr with Model 19, No.115870

Exposure Rate Measurements
Molycorp - Building 29 Survey Unit (Affected Area)

Building Bathroom

Location	Exposure Rate (uR/hr)	Net Exp Rate (uR/hr)
W1	10	0
W2	10	0
W3	10	0
W4	10	0
F1	10	0
C1	10	0
C2	10	0

Background dose rate: 10 uR/hr with Model 19, No.115870

Exposure Rate Measurements
Molycorp - Building 29 Survey Unit (Affected Area)

Building Ceiling (Interior)

Location	Exposure Rate (uR/hr)	Net Exp Rate (uR/hr)	Location	Exposure Rate (uR/hr)	Net Exp Rate (uR/hr)
C1	5	-1	C13	7	1
C2	6	0	C14	7	1
C3	7	1	C15	7	1
C4	7	1	C16	7	1
C5	7	1	C17	6	0
C6	7	1	C18	8	2
C7	7	1	C19	8	2
C8	7	1	C20	7	1
C9	7	1	C21	7	1
C10	7	1	C22	7	1
C11	7	1	C23	8	2
C12	7	1	C24	8	2

Background dose rate: 5-7 uR/hr with Model 19, No.115870

Exposure Rate Measurements
Molycorp - Building 29 Survey Unit (Affected Area)

Building Exterior (Walls)

Location	Exposure Rate (uR/hr)	Net Exp Rate (uR/hr)	Location	Exposure Rate (uR/hr)	Net Exp Rate (uR/hr)
W1	8	-4	W17	9	-3
W2	9	-3	W18	10	-2
W3	9	-3	W19	10	-2
W4	15	3	W20	10	-2
W5	15	3	W21	10	-2
W6	16	4	W22	8	-4
W7	17	5	W23	9	-3
W8	15	3	W24	9	-3
W9	11	-1	W25	9	-3
W10	12	0	W26	10	-2
W11	14	2	W27	8	-4
W12	15	3	W28	9	-3
W13	14	2	W29	9	-3
W14	11	-1	W30	10	-2
W15	10	-2	V1	10	-2
W16	10	-2			

Background dose rate: 9-12 uR/hr with Model 19, No.115870

Exposure Rate Measurements
Molycorp - Building 29 Survey Unit (Affected Area)

Building Exterior (Roof)

Location	Exposure Rate (uR/hr)	Net Exp Rate (uR/hr)	Location	Exposure Rate (uR/hr)	Net Exp Rate (uR/hr)
see map	9	-3	see map	11	-1
see map	9	-3	see map	10	-2
see map	10	-2	see map	10	-2
see map	9	-3	see map	9	-3
see map	11	-1	see map	12	0
see map	9	-3	see map	11	-1
see map	10	-2	see map	10	-2
see map	9	-3	see map	9	-3
see map	11	-1	see map	12	0
see map	9	-3	see map	11	-1
see map	10	-2	see map	11	-1
see map	9	-3	see map	10	-2
see map	11	-1	see map	12	0
see map	10	-2	see map	12	0
see map	10	-2	see map	12	0
see map	9	-3	see map	11	-1

Background dose rate: 9-12 uR/hr with Model 19, No.115870

Summary of Building Surface Direct Reading (Total Activity) Results
Molycorp - Building 29 Survey Unit (Affected Area)

Including all building interior and exterior measurements

Beta				Alpha			
n	$\bar{x}$	s	μ_α	n	$\bar{x}$	s	μ_α
214	-1	251.0	27.8	214	-1	501.9	55.7

$t_{1-\alpha}$ 1.654

Guidelines/Conditions Satisfied?

Beta	Alpha
Yes	Yes

Summary of Exposure Rate Measurements
Molycorp - Building 29 Survey Unit (Affected Area)

Including all building interior and exterior measurements (uR/hr)

n	$\bar{x}$	s	μ_α
243	-0.3	1.7	-0.1

$t_{1-\alpha}$ 1.653

Guidelines/Conditions Satisfied?
Yes

	DDO-138 Radiation Protection Survey Report	Site: Molycorp / Washington, PA

Section 1: Survey Information 100% survey report.

Date:	Time:	Location:	Survey Issue Log Number:
03-25-02	0800	Building 29	02-0095

RWP Number:	Purpose of Survey:	Page 1 of 17
N/A	☐ RWP ☐ Routine Survey ☐ Unconditional Release ☑ Other:	

Survey Title: Verification of affected building.

#2929 #152202
3-25-02 smears W1-W38 BKg β⁻ 43 α .36
MDA MB 34 MB 150 MB 16 14.5

#2929 #152202
3-26-02 smears W39-W62 F1-F87 BKg β⁻ 45 α .07
MDA 153 12

2929 #152202 smears W1-W21 W1-W4 F-1 C-1 C-2 BKg β⁻ 46 α .13
MDA 154 12

See Below for Eff. & Cal Due

* Also used for static 1 minute Readings on Floor
BKG β⁻ = 78 MDA = 497
BKG α = 2.4 MDA = 65

Smear Number	Beta dpm/100cm²	Alpha dpm/100cm²
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		

N/A

Bkgd Readings: 10 Micro R Model 19 S/N 115870 CAL DUE 8-6-02

Legend:
00 = mRem/h gamma | 00 C = mRem/h gamma contact | ① = Smear Location | ▽ = Air Sample Location | -X-X-X- = Rope, Boundary, or Barrier
00 β = mRem/h beta | 00 βC = mRem/h beta contact | —①— = Large Area Wipe | = Bulk Material Sample

Section 2: Instrument Used

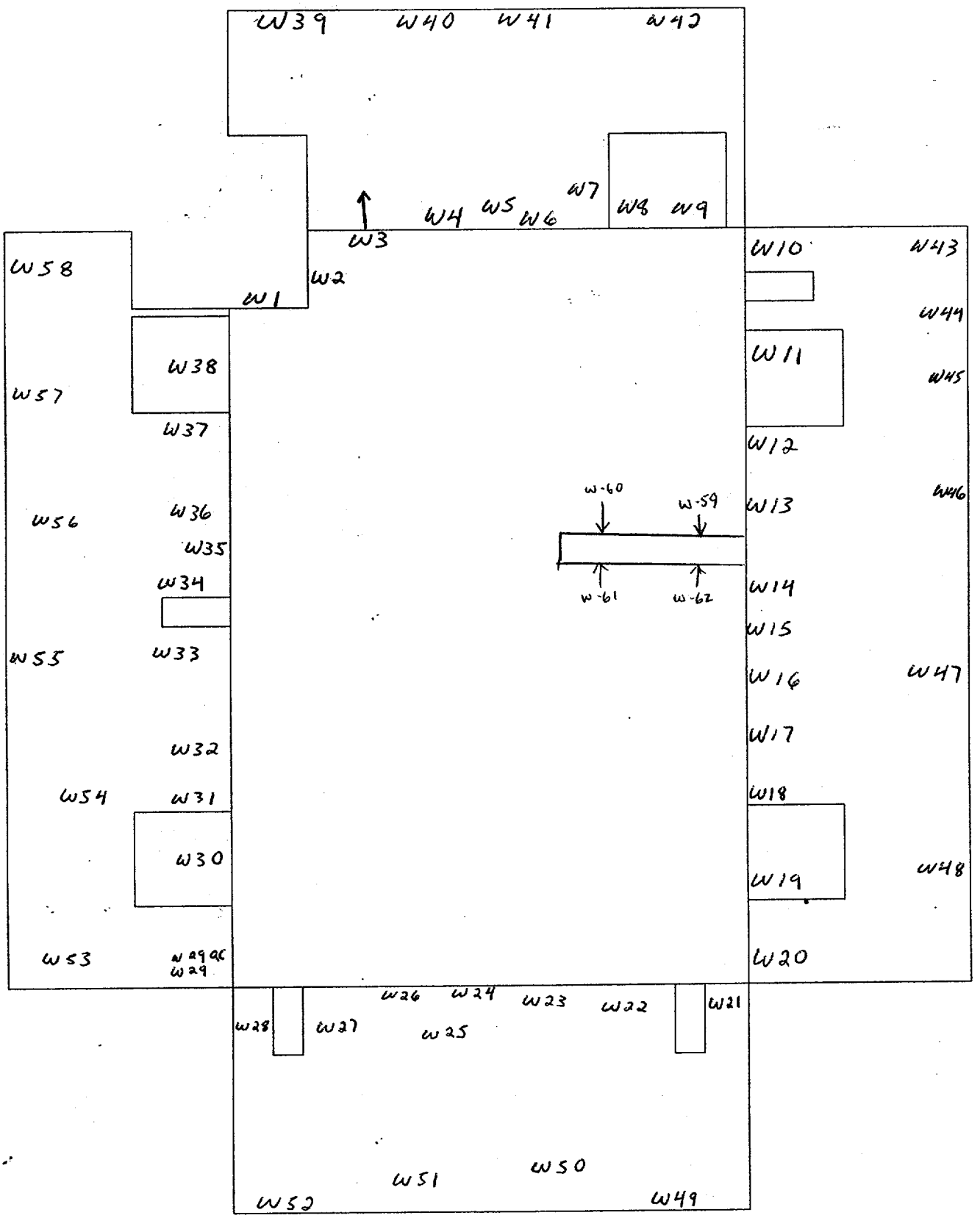
Instrument Model/SN:	Cal Due Date:	Probe Model/SN:	Cal Due Date:	Detector Eff.: (cpm/dpm)	MDA:	Other BKG
2350-1/95359	8-6-02	43-37/092503	8-6-02	β⁻ .27 / α .207	β⁻ 188 / α 16	β⁻ 1470 / α 6.4
2350-1/117014	8-13-02	43-106/133866	8-6-02	β⁻ .248 / α .211	β⁻ 620 / α 45	β⁻ 264 / α 1
2360/164680	7-9-02	43-89/118544	8-6-02	β⁻ .113 / α .164	β⁻ 140 / α 21	β⁻ 8 / α 3.7
* 2360/156371	8-15-02	43-89/164932	8-5-02	β⁻ .088 / α .153	β⁻ 180 / α 76	β⁻ 8 / α 3.7
2929/152202	2-6-03	43-10/156519	2-6-03	β⁻ .165 / α .344	β⁻ 34 / α 1.6	β⁻ 43 / α .36

Section 3: Review and Approval

Survey Performed By (Sign):	Area Posted and/or Barricaded:	Date and Time:
Mark Blonciik	☐ Yes ☐ No ☑ Not Required	3-27-02 / 1700
Radiation Safety Officer (Print Name & Sign): Mike McDonald		Date and Time: 4-16-02 9:45

Building 29
North

Survey # 02-0095



Interior

Scale:
4m x 4m

Mark Blanchette

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Radiological Survey Results - Survey Location Indicator

Survey Area Information: Bldg # 29 Interior walls

Survey # 02-0095

Instrument Data	Instrument Model/SN	Cal Due	Probe Model/SN	Cal Due	α Scan MDA	β Scan MDA	α Static MDA	β Static MDA

Performed By:	Print Name	Signature	Date
	MARK BLANCIAK	Mark Blanciak	

Location	β Scan (cpm)	α Scan (cpm)	β Static (unsh) (cpm)	β Static (sh) (cpm)	α Static (cpm)	ER (μrem/hr)	Smears (dpm/100 cm²) α	Smears (dpm/100 cm²) β
W-1	300	.6	328	310	1	8	-1	-6
W-2	265	.6	240	204	1	12	-1	0
W-3	225	1	212	191	2	10	-1	30
W-4	265	1	186	213	4	10	-1	48
W-5	245	.2	227	202	0	12	-1	12
W-6	250	.5	237	229	0	12	-1	0
W-7	300	1.2	195	214	2	10	-1	61
W-8	260	.4	255	242	3	10	1.9	-12
W-9	280	1	243	239	0	10	-1	0
W-10	300	1	282	244	2	10	-1	-6
W-11	220	0.4	240	311	4	10	-1	24
W-12	340	1.4	239	219	0	10	-1	18
W-13	290	1	291	301	2	10	-1	-42
W-14	360	1.8	264	263	5	10	1.9	-24
W-15	360	1	265	240	6	10	-1	-55
W-16	330	.5	284	231	4	10	-1	79
W-17	280	1	332	295	9	10	-1	85
W-18	290	0.4	261	243	1	10	-1	0
W-19	300	1	268	242	3	10	-1	18
W-20	310	1.8	208	191	6	12	-1	-60
W-21	320	1	278	234	7	10	-1	18
W-22	300	1.4	230	232	1	12	1.9	-18
W-23	280	.8	230	247	3	12	-1	36
W-24	300	1	385	300	3	14	4.8	18
W-25	300	1	641	326	7	14	-1	36
W-26	330	1.8	1400	729	4	12	-1	67
W-27	260	1	244	247	0	10	-1	-54

Radiological Survey Results - Survey Location Indicator

Survey Area Information: Bldg 29 (Interior walls) Survey # 02-0095

Instrument Data	Instrument Model/SN	Cal Due	Probe Model/SN	Cal Due	α Scan MDA	β Scan MDA	α Static MDA	β Static MDA

Performed By:	Print Name	Signature	Date
	MARK BLANCIAK	Mark Blanciak	

Location	β Scan (cpm)	α Scan (cpm)	β Static (unsh) (cpm)	β Static (sh) (cpm)	α Static (cpm)	ER (μrem/hr)	Smears (dpm/100 cm²) α	Smears (dpm/100 cm²) β
W-28	290	1	229	205	2	10	-1	-24
W-29	270	2	260	256	3	10	-1	0
W-29 QC	260	1	239	216	5	10	-1	-18
W-30	290	1.2	260	251	8	10	-1	-18
W-31	340	1	226	206	2	10	1.9	24
W-32	320	2	222	208	4	10	1.9	-49
W-33	300	1	255	234	5	10	-1	97
W-34	260	1	212	175	3	10	-1	-18
W-35	280	2	286	253	6	10	-1	60
W-36	280	2	300	251	4	10	1.9	0
W-37	270	1.6	215	202	1	10	-1	-18
W-38	260	1.2	234	222	4	10	1.9	6
W-39	240	1	182	181	2	5	-.17	-30
W-40	260	1	187	160	1	6	2.7	-48
W-~~50~~ 41	280	1.4	226	180	2	7	2.7	-36
W-42	260	2	254	208	4	7	2.7	-6
W-43	260	1	212	171	2	7	-.17	48
W-44	270	1	212	184	2	7	-.17	18
W-45	280	0	220	192	0	7	-.17	72
W-46	300	1.2	199	212	2	7	-.17	24
W-47	310	2	220	216	3	7	2.7	30
W-48	300	3	219	239	3	8	-.17	-24
W-49	290	0	251	228	1	8	2.7	-36
W-50	280	1	220	211	3	8	2.7	18
W-51	280	2	270	233	0	8	-.17	-6
W-52	270	1	240	196	1	8	-.17	-24
W-53	280	2	215	225	3	8	-.17	18

Radiological Survey Results - Survey Location Indicator

Survey Area Information: Bldg 29 INTERIOR Walls) Survey # 02-0095

Instrument Data	Instrument Model/SN	Cal Due	Probe Model/SN	Cal Due	α Scan MDA	β Scan MDA	α Static MDA	β Static MDA

Performed By:	Print Name	Signature	Date
	MARK BLANCIAK	Mark Blanciak	

Location	β Scan (cpm)	α Scan (cpm)	β Static (unsh) (cpm)	β Static (sh) (cpm)	α Static (cpm)	ER (μrem/hr)	Smears (dpm/100 cm²) α	Smears (dpm/100 cm²) β
W-54	260	1	218	211	1	7	-.17	-24
W-55	260	2	209	200	5	8	-.17	18
W-56	240	1	199	163	2	8	-.17	-6
W-57	250	1	163	185	3	7	-.17	-24
W-58	240	1	181	174	4	7	2.7	-36
W-59	200	0	221	235	4	10	-.17	42
W-60	220	.6	196	209	4	10	-.17	30
W-61	220	.6	216	220	1	10	2.7	0
W-62	250	0	208	247	2	10	-.17	-6

Building 29
North

Survey # 02-0095

Bkgd 5-7 cm/hr

C-1	C-2	C-3	C-4
C-5	C-6	C-7	C-8
C-9	C-10	C-11	C-12
C-13	C-14	C-15	C-16
C-17	C-18	C-19	C-20
C-21 C-21 QC	C-22	C-23	C-24

Ceiling

Scale:
4m x 4m

Mark Blaucut

Radiological Survey Results - Survey Location Indicator

Survey Area Information: Bldg 29 Interior Ceiling

Survey # 02-0095

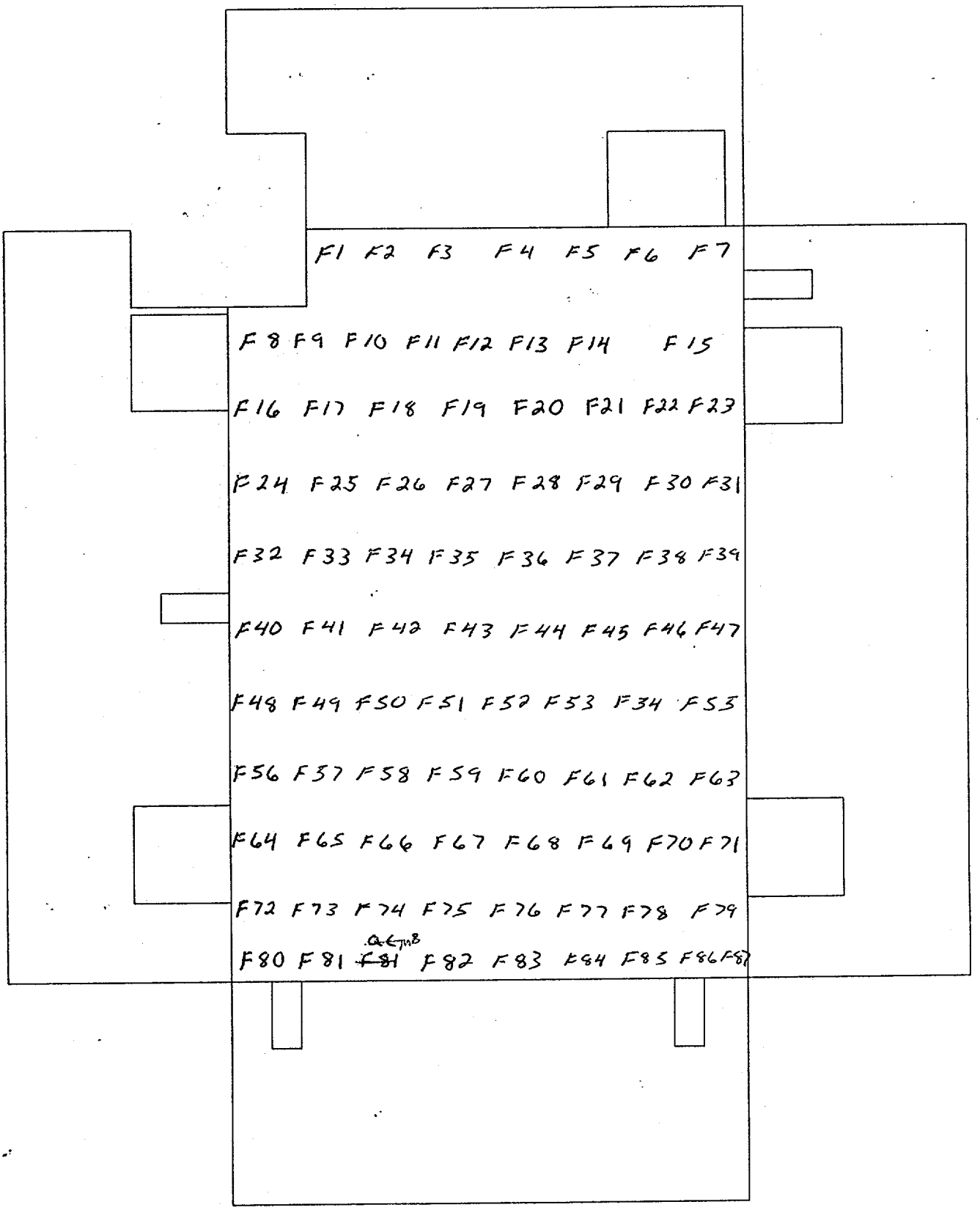
Instrument Data	Instrument Model/SN	Cal Due	Probe Model/SN	Cal Due	α Scan MDA	β Scan MDA	α Static MDA	β Static MDA

Performed By:	Print Name	Signature	Date
	MARK BLANCIAK	Mark Blanciak	

Location	β Scan (cpm)	α Scan (cpm)	β Static (unsh) (cpm)	β Static (sh) (cpm)	α Static (cpm)	ER (μrem/hr)	Smears (dpm/100 cm²) α	Smears (dpm/100 cm²) β
C-1	260	0	251	220	5	5	-.17	-6
C-2	260	0	246	211	3	6	2.7	24
C-3	280	1	201	262	2	7	2.7	-78
C-4	280	1	254	266	4	7	2.7	-36
C-5	280	1	217	225	3	7	-.17	-24
C-6	260	0	228	253	2	7	-.17	18
C-7	290	0	213	229	3	7	-.17	-6
C-8	270	1.4	241	216	4	7	-.17	18
C-9	280	1	232	221	5	7	-.17	-24
C-10	270	1.2	230	206	2	7	-.17	18
C-11	280	1	213	235	3	7	-.17	-36
C-12	260	0	219	240	3	7	2.7	-42
C-13	280	1.4	237	217	1	7	-.17	-6
C-14	290	1.6	233	251	1	7	-.17	-48
C-15	290	0	266	248	2	7	-.17	-18
C-16	290	1	239	270	0	7	2.7	-6
C-17	280	2	252	237	2	6	2.7	6
C-18	270	1	267	246	1	8	-.17	18
C-19	270	1	265	234	2	8	-.17	30
C-20	280	2.2	246	229	2	7	2.7	12
C-21	270	1.2	260	244	2	7	2.7	-36
C-21QC	260	0	241	247	2	7	-.17	-12
C-22	280	2	285	249	1	7	-.17	-24
C-23	280	2	267	271	3	8	2.7	12
C-24	290	1	260	266	1	8	-.17	6

Building 29
North

Survey #
02-0095



Interior

Scale:
4m x 4m

Interior Floor
Mark Blaucik

Radiological Survey Results - Survey Location Indicator

Survey Area Information: Bldg #29 Interior (Floor) Survey # 02-0095

Instrument Data	Instrument Model/SN	Cal Due	Probe Model/SN	Cal Due	α Scan MDA	β Scan MDA	α Static MDA	β Static MDA

Performed By:	Print Name	Signature	Date
	MARK BLANCIAK	Mark Blanciak	
	Tammie S. Darby	Tammie S. Darby	

Location	β Scan (cpm)	α Scan (cpm)	β Static (unsh) (cpm)	β Static (sh) (cpm)	α Static (cpm)	ER (μrem/hr)	Smears (dpm/100 cm²) α	Smears (dpm/100 cm²) β
F-1	1500	10	364	299	2	8	-.2	-42
F-2	1500	11	370	293	4	12	2.7	0
F-3	1550	9	372	292	10	10	-.2	12
F-4	1600	12	350	260	5	10	-.2	-30
F-5	1600	12	373	299	3	10	2.7	0
F-6	1600	8	320	262	1	10	-.2	48
F-7	1800	14	378	279	8	12	-.2	-6
F-8	1700	12	377	299	2	12	-.2	6
F-9	1450	13	352	272	5	12	-.2	-48
F-10	1650	10	370	289	3	10	-.2	-24
F-11	1600	11	333	260	2	10	-.2	6
F-12	1500	8	335	270	2	10	-.2	-48
F-13	1600	14	333	289	2	10	-.2	6
F-14	1550	12	324	262	3	10	-.2	-272
F-15	1600	12	392	278	6	10	-.2	-48
F-16	1700	16	348	242	2	10	2.7	54
F-17	1700	14	392	271	10	10	-.2	12
F-18	12,500	26	742	333	38	10	-.2	30
F-19	15,000	60	2,711	464	46	10	-.2	-48
F-20	1600	12	269	209	4	10	-.2	0
F-21	1300	12	327	269	1	11	2.7	18
F-22	1700	10	335	285	3	11	2.7	-18
F-23	1750	15	357	265	4	12	2.7	48
F-24	1700	12	376	243	5	11	-.2	-42
F-25	4000	20	489	260	10	10	2.7	-18
F-26	12000	16	2098	432	21	10	-.2	0
F-27	1800	14	337	259	6	10	-.2	6

Radiological Survey Results - Survey Location Indicator

Survey Area Information: Bldg # 29 Interior (Floor) Survey # 02-0095

Instrument Data	Instrument Model/SN	Cal Due	Probe Model/SN	Cal Due	α Scan MDA	β Scan MDA	α Static MDA	β Static MDA

Performed By:	Print Name	Signature	Date
	MARK BLANCIAK	Mark Blanciak	
	Tommie S. Darby	Tommie S. Darby	

Location	β Scan (cpm)	α Scan (cpm)	β Static (unsh) (cpm)	β Static (sh) (cpm)	α Static (cpm)	ER (μrem/hr)	Smears (dpm/100 cm²) α	Smears (dpm/100 cm²) β
F-28	1800	11	374	295	5	10	-.2	-36
F-29	1700	12	384	238	3	10	-.2	-272
F-30	1650	8	392	298	1	10	-.2	12
F-31	1600	13	369	304	12	9	-.2	42
F-32	1900	15	379	349	4	10	-.2	-72
F-33	13000	84	8396	1061	118	10	2.7	90
F-34	5000	22	609	272	23	10	-.2	-54
F-35	3600	30	383	305	11	10	-.2	12
F-36	2300	12	402	298	3	10	-.2	18
F-37	1700	9	345	267	3	10	-.2	-18
F-38	1470	10	435	308	3	10	-.2	36
F-39	1600	16	404	359	3	9	-.2	-12
F-40	1800	14	388	231	4	11	2.7	48
F-41	1780	12	389	239	3	10	2.7	12
F-42	1600	10	315	252	3	10	-.2	-36
F-43	1600	13	370	272	6	10	-.2	-18
F-44	1450	8	323	259	5	10	-.2	6
F-45	1600	11	369	255	2	10	-.2	-24
F-46	1700	12	353	239	3	10	-.2	42
F-47	1700	12	373	302	6	11	-.2	30
F-48	2100	14	356	267	3	11	-.2	-272
F-49	1900	10	378	270	5	10	-.2	-36
F-50	20000	100	6194	595	89	10	2.7	-60
F-51	1820	14	330	234	2	11	-.2	-272
F-52	1700	10	343	288	4	10	-.2	24
F-53	1550	12	409	319	13	10	-.2	48
F-54	2000	14	413	326	3	10	-.2	-272

Radiological Survey Results - Survey Location Indicator

Survey Area Information: Bldg #29 Interior (Floor) Survey # 02-0095

Instrument Data	Instrument Model/SN	Cal Due	Probe Model/SN	Cal Due	α Scan MDA	β Scan MDA	α Static MDA	β Static MDA

Performed By:	Print Name	Signature	Date

Location	β Scan (cpm)	α Scan (cpm)	β Static (unsh) (cpm)	β Static (sh) (cpm)	α Static (cpm)	ER (μrem/hr)	Smears (dpm/100 cm²) α	Smears (dpm/100 cm²) β
F-55	1600	12	395	314	10	10	2.7	30
F-56	1,600	11	363	295	8	11	2.7	24
F-57	10,000	100	1941	321	148	10	-.2	18
F-58	3,600	26	729	359	9	10	-.2	-272
F-59	1,830	12	333	305	5	10	-.2	24
F-60	1,600	12	337	270	2	11	-.2	-272
F-61	1,600	15	365	248	2	10	-.2	36
F-62	2,400	14	509	295	7	11	-.2	-272
F-63	1950	10	413	300	22	11	-.2	24
F-64	1800	11	328	300	10	10	2.7	48
F-65	1600	12	317	291	4	10	-.2	-272
F-66	1700	14	388	299	11	10	-.2	6
F-67	1600	12	318	273	3	10	-.2	-272
F-68	1600	12	378	280	4	10	-.2	18
F-69	1800	10	339	274	5	10	-.2	30
F-70	1700	13	400	253	10	10	2.7	54
F-71	1500	14	413	308	11	11	-.2	24
F-72	1700	12	361	288	4	11	-.2	-272
F-73	1800	14	431	315	7	10	-.2	-272
F-74	1600	15	335	286	4	10	-.2	-272
F-75	13000	20	12621	754	579	11	-.2	0
F-76	6000	15	6981	670	224	10	2.7	6
F-77	1980	12	341	274	6	10	-.2	-272
F-78	2000	13	338	259	2	12	-.2	0
F-79	1650	11	318	268	6	10	-.2	0
F-80	1700	15	331	273	4	10	-.2	0
F-81	1620	12	341	265	8	12	-.2	78

Radiological Survey Results - Survey Location Indicator

Survey Area Information: Bldg #29 Interior (Floor) Survey # 02-0095

Instrument Data	Instrument Model/SN	Cal Due	Probe Model/SN	Cal Due	α Scan MDA	β Scan MDA	α Static MDA	β Static MDA

Performed By:	Print Name	Signature	Date

Location	β Scan (cpm)	α Scan (cpm)	β Static (unsh) (cpm)	β Static (sh) (cpm)	α Static (cpm)	ER (μrem/hr)	Smears (dpm/100 cm²) α	Smears (dpm/100 cm²) β
F-81 QC			334	306	5	10	-.2	30
F-82	1900	10	406	284	6	12	2.7	24
F-83	2000	12	414	305	9	12	-.2	-84
F-84	3200	18	715	399	8	14	-.2	-272
F-85	2300	12	453	311	21	12	-.2	-90
F-86	2300	14	435	310	15	12	-.2	-272
F-87	1800	10	319	282	8	10	-.2	-272

Radiological Survey Results - Survey Location Indicator

Survey Area Information: Bldg# 29 Exterior Walls

Survey # 02-0095

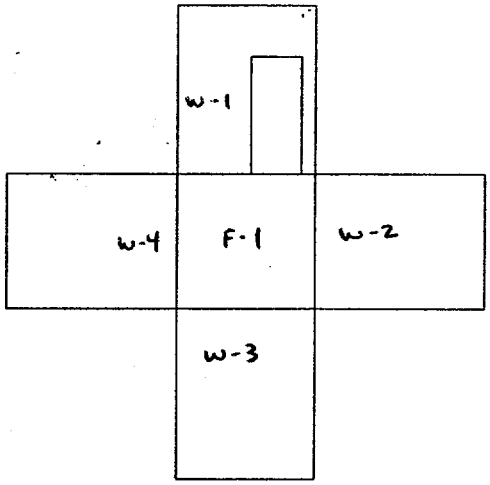
Instrument Data	Instrument Model/SN	Cal Due	Probe Model/SN	Cal Due	α Scan MDA	β Scan MDA	α Static MDA	β Static MDA

Performed By:	Print Name	Signature	Date
	MARK BLANCIAK	Mark Blanciak	
	Tammie S. Darby	Tammie S. Darby	

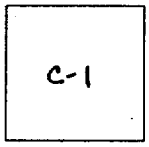
Location	β Scan (cpm)	α Scan (cpm)	β Static (unsh) (cpm)	β Static (sh) (cpm)	α Static (cpm)	ER (μrem/hr)	Smears (dpm/100 cm²) α	Smears (dpm/100 cm²) β
W-1	N/A	N/A	228	198	1	8	-.4	-54
W-2	340	1	214	225	4	9	-.4	48
W-3	N/A	N/A	240	205	4	9	-.4	30
W-4	N/A	N/A	319	299	1	15	-.4	18
W-5	N/A	N/A	286	284	2	15	-.4	54
W-6	340	1.5	277	265	0	16	2.5	-66
W-7	N/A	N/A	286	259	2.	17	-.4	-60
W-8	N/A	N/A	328	274	1	15	2.5	24
W-9	300	4	258	260	4	11	-.4	-54
W-10	N/A	N/A	269	237	1	12	-.4	60
W-11	N/A	N/A	262	249	2	14	-.4	-18
W-12	N/A	N/A	256	253	3	15	-.4	-85
W-13	380	3	293	300	0	14	-.4	18
W-14	N/A	N/A	265	256	3	11	2.5	30
W-15	280	4	228	234	5	10	5.8	18
W-16	N/A	N/A	231	200	4	10	-.4	-24
W-17	N/A	N/A	233	209	3	9	2.5	-42
W18	N/A	N/A	243	224	1	10	-.4	0
W19	N/A	N/A	195	196	3	10	-.4	18
W20	N/A	N/A	244	220	1	10	-.4	-18
W 20 QC	N/A	N/A	216	200	2	10	-.4	-78
W 21	290	1	227	220	5	10	-.4	60
W-22	N/A	N/A	183	180	3	8	-.4	-60
W-23	N/A	N/A	198	163	1	9	-.4	30
W-24	N/A	N/A	195	197	4	9	-.4	18
W-25	N/A	N/A	193	186	4	9	-.4	-66
W-26	N/A	N/A	210	181	4	10	-.4	-54

Building 29
North

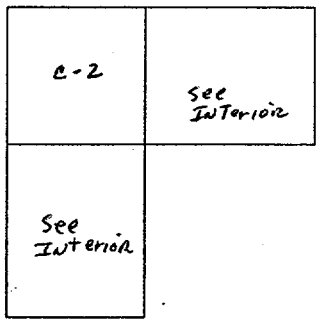
Survey # 02-0095



Bathroom Interior



Bathroom Ceiling



Bathroom Exterior

Ceiling

Scale: 4m x 4m

Mark B. Lanciault

Radiological Survey Results - Survey Location Indicator

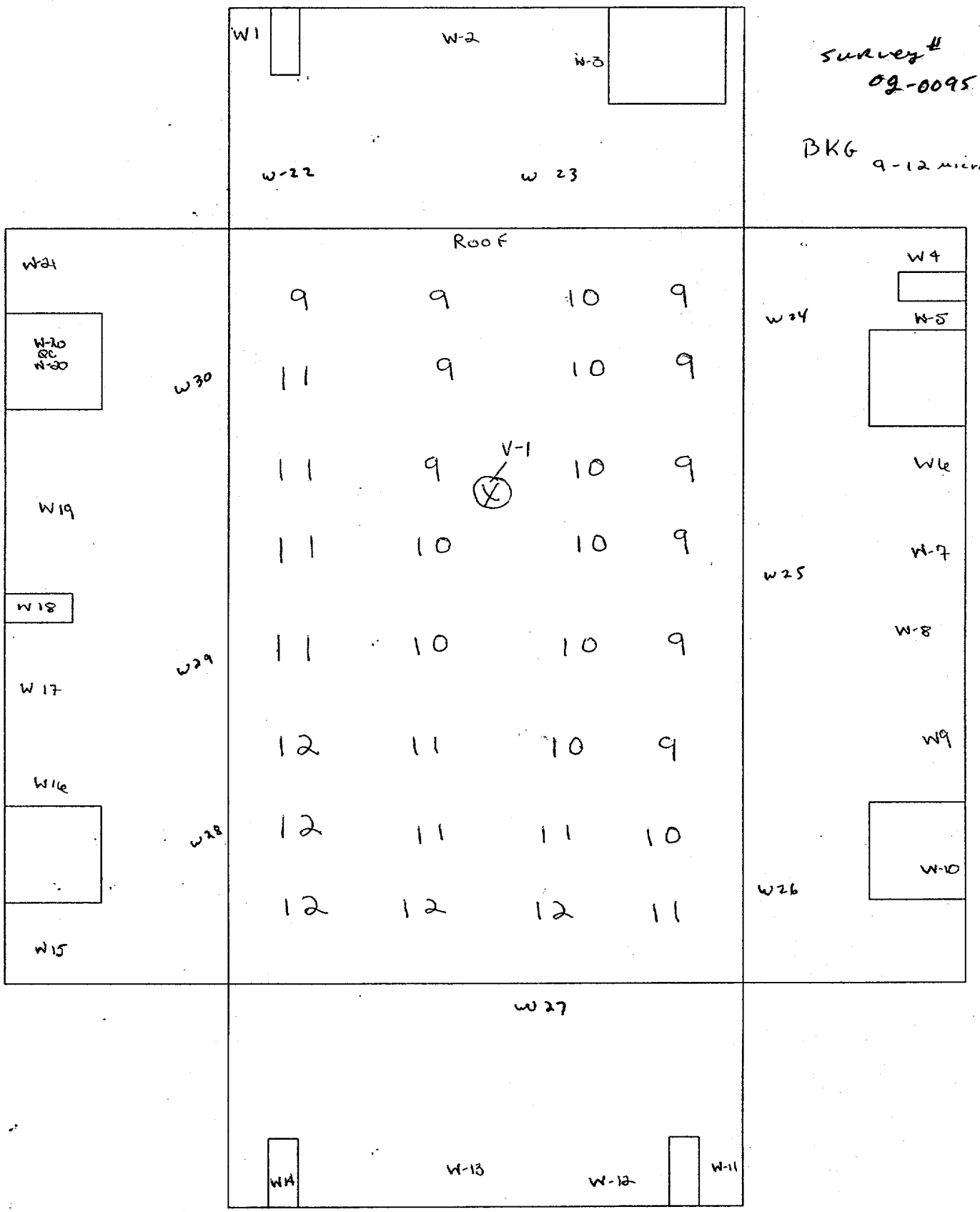
Survey Area Information: Bldg #29 BATH ROOM # SURVEY 02-0095

Instrument Data	Instrument Model/SN	Cal Due	Probe Model/SN	Cal Due	α Scan MDA	β Scan MDA	α Static MDA	β Static MDA

Performed By:	Print Name	Signature	Date
	MARK BLANCIAK	Mark Blanciak	3-25-02 ~~3-28-02~~ MB

Location	β Scan (cpm)	α Scan (cpm)	β Static (unsh) (cpm)	β Static (sh) (cpm)	α Static (cpm)	ER (μrem/hr)	Smears (dpm/100 cm²) α	Smears (dpm/100 cm²) β
W-1	300	2	181	182	0	10	2.5	-12
W-2	280	2	258	243	1	10	-0.4	-12
W-3	340	2	297	270	2	10	-0.4	12
W-4	320	1	221	201	2	10	2.5	12
F-1	350	2	404	287	2	10	5.4	100
C-1	300	1	272	242	0	10	-0.4	38
C-2	280	1	223	210	4	10	2.5	12

Building 29
North



survey # 02-0095

BKG 9-12 micro Rem/hr

Exterior

Scale: 4m x 4m

Mark Blaucik

Radiological Survey Results - Survey Location Indicator

Survey Area Information: Bldg #29 Exterior WALLS Survey 02-0095

Instrument Data	Instrument Model/SN	Cal Due	Probe Model/SN	Cal Due	α Scan MDA	β Scan MDA	α Static MDA	β Static MDA

Performed By:	Print Name	Signature	Date
	MARK BLANCIAK	Mark Blanciak	

Location	β Scan (cpm)	α Scan (cpm)	β Static (unsh) (cpm)	β Static (sh) (cpm)	α Static (cpm)	ER (μrem/hr)	Smears (dpm/100 cm²) α	Smears (dpm/100 cm²) β
W-27	N/A	N/A	250	253	1	8	-.4	-18
W-28	N/A	N/A	227	181	2	9	-.4	30
W-29	N/A	N/A	184	185	4	9	-.4	-42
W-30	N/A	N/A	152	191	4	10	-.4	-18
V-1 =	(ROOF	VENT)						
* V-1	N/A	N/A	238	230	4	10	2.5	-12

* Roof Vent

	DDO-138 Radiation Protection Survey Report	Site: Molycorp / Washington, PA

Section 1: Survey Information

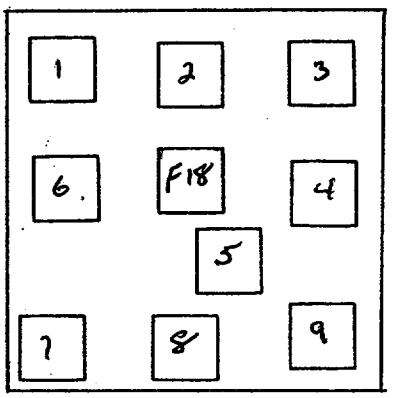
Date:	Time:	Location:	Survey Issue Log Number
4-10-02	1200	Bldg 29	02 - 0108

RWP Number:	Purpose of Survey:	Page
N/A	☐ RWP ☐ Routine Survey ☐ Unconditional Release ☒ Other:	1 of 5

Survey Title: Post Remediation Survey

Some of the concrete was removed in the South End of the Bldg F 25, 26, & 84

Some of the Perlins will be removed and stored in an RMA prior to Bldg Demolition (South wall only) W24, 25 & 26



$1043\left(\frac{100}{10{,}000}\right) + -339\left(1-\frac{100}{10000}\right)$

10.43 + -335

-325 AVE

(SEE PAGE 2)

Smear Number	Beta dpm/100cm²	Alpha dpm/100cm²
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13	N	A
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		

Bkgd Readings: α 2.4 β⁻ 78

Legend:

00 = mRem/h gamma | 00 C = mRem/h gamma contact | ① = Smear Location | ▽ = Air Sample Location | -X-X-X- = Rope, Boundary, or Barrier

00 β = mRem/h beta | 00 βC = mRem/h beta contact | –Ⓓ– = Large Area Wipe | = Bulk Material Sample

Section 2: Instrument Used

Instrument Model/SN:	Cal Due Date:	Probe Model/SN:	Cal Due Date:	Detector Eff.: (cpm/dpm)	MDA:	Other
2224/129463	8-6-02	43-89/169230	8-6-02	α .154 β⁻ .092	α 66 β⁻ 476	
N		N		N		N
A		A			A	A

Section 3: Review and Approval

Survey Performed By (Sign):	Area Posted and/or Barricaded:	Date and Time:
[signature]	☐ Yes ☐ No ☒ Not Required	4-10-02 1200
Radiation Safety Officer (Print Name & Sign): Mike McDonald [signature]		Date and Time: 4-16-02 9:48

Radiological Survey Results - Calculational Sheet

02-0108

Location	β Static (unsh) (cpm)	β Static (sh) (cpm)	Gross β	Minus Bkgd = (Net β)	Net β dpm/100 cm²
1	287	263	24	-54	-587
2	316	289	27	-51	-554
3	304	259	45	-33	-359
4	288	267	21	-57	-620
5	305	237	68	-10	-109
6	328	261	67	-11	-120
7	331	260	71	-7	-76
8	319	259	60	-18	-196
9	309	271	38	-40	-435
					-339 AVE

N A

Instrument Model/SN:	Probe Model/SN:	Detector Eff.: (cpm/dpm)

N A

Material	Bkgd
CONCRETE	α 2.4 β 18

Radiological Survey Results - Survey Location Indicator

02-0108

Survey Area Information:

Instrument Data	Instrument Model/SN	Cal Due	Probe Model/SN	Cal Due	α Scan MDA	β Scan MDA	α Static MDA	β Static MDA
	N/A				N/A			

Performed By:	Print Name	Signature	Date
	N/A	N/A	N/A

Location	β Scan (cpm)	α Scan (cpm)	β Static (unsh) (cpm)	β Static (sh) (cpm)	α Static (cpm)	ER (μrem/hr)	Smears (dpm/100 cm²) α	Smears (dpm/100 cm²) β
F18			330	229	5			
F18			426	251	7			
F19			313	280	4			
F19			368	273	4			
F24			330	290	6			
F25			332	258	8			
F26			338	291	3			
F26			360	253	7			
F29			354	293	7			
F33			347	271	6			
F33	N/A		289	235	9		N/A	
F34			340	294	12			
F38			366	259	8			
F40			358	279	7			
F41			312	274	5			
F50			361	309	5			
F50			372	308	22			
F57			421	306	12			
F59			355	323	5			
F58			380	284	7			
F62			388	309	7			
F70			391	294	8			
F71			392	337	10			
F75			323	293	26			
F76			336	303	18			
F83			311	261	4			
F84			328	256	8			

Radiological Survey Results - Survey Location Indicator

02-0108

Survey Area Information:

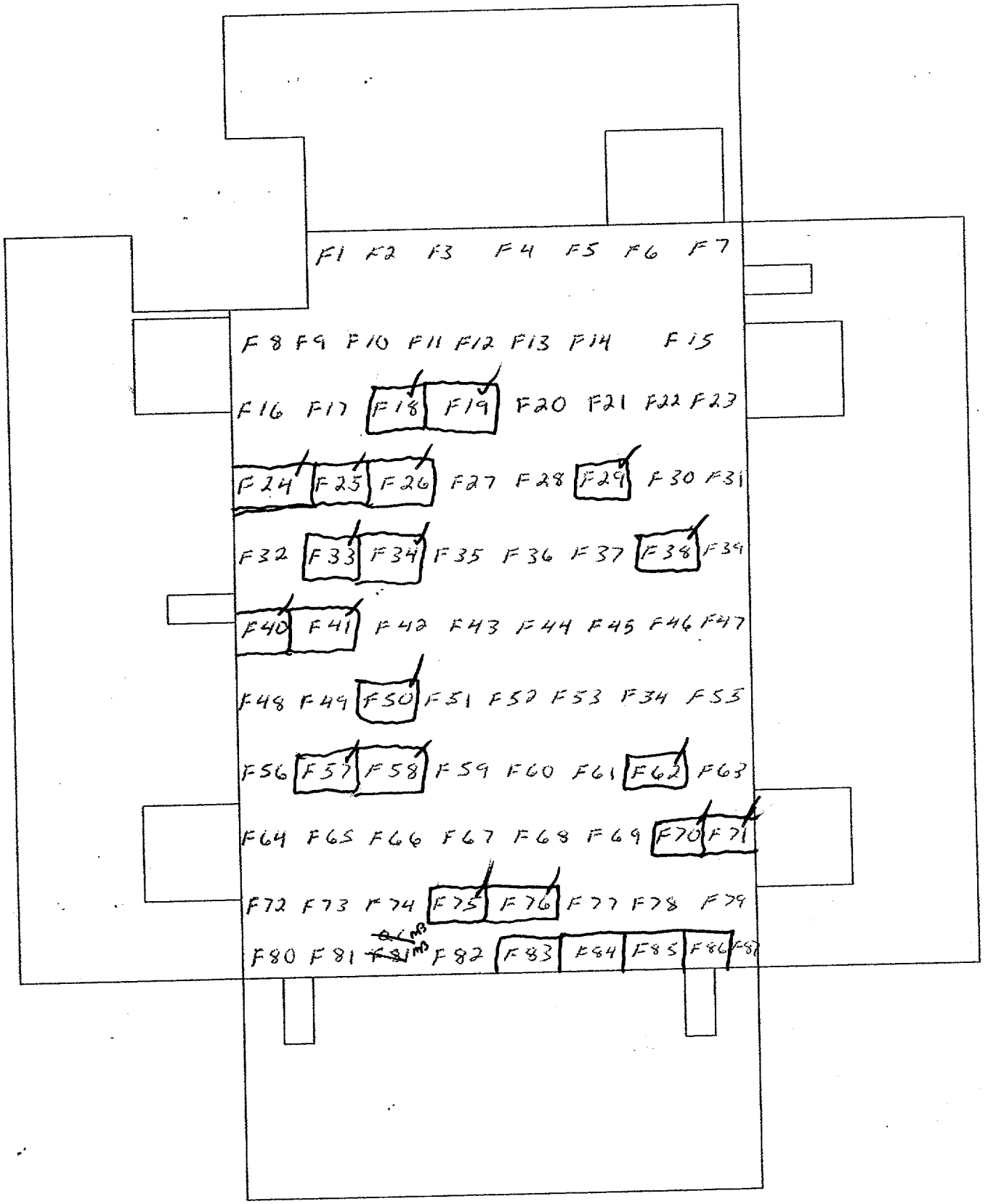
Instrument Data	Instrument Model/SN	Cal Due	Probe Model/SN	Cal Due	α Scan MDA	β Scan MDA	α Static MDA	β Static MDA
	N/A					N/A		

Performed By:	Print Name	Signature	Date
	N/A	N/A	N/A

Location	β Scan (cpm)	α Scan (cpm)	β Static (unsh) (cpm)	β Static (sh) (cpm)	α Static (cpm)	ER (µrem/hr)	Smears (dpm/100 cm²) α	Smears (dpm/100 cm²) β
F85	N		319	248	6			
F86		A	354	300	7			
				N	A			

Survey
02 ~~0015~~
0108

North



Interior

Scale:
4m x 4m

Interior Floor
Mark Blanchard

Appendix G

Building 32 Data Package

Molycorp Washington, PA

Building 32 Data Package

This data package contains final status survey information for Building 32, Molycorp, Washington, PA site.

Field data collection forms, survey report forms, statistical test results, and comparisons to release limits are provided.

Summary

During the final status survey of Building 32, elevated radioactivity was identified in multiple localized areas on the concrete floor and on several structural support components of the building (purlins). The building's classification was changed from unaffected to affected, and an affected final status survey was performed.

It was determined that the activity identified on the floor was fixed into the concrete, and required surface removal of the concrete in the identified areas. The activity identified on the purlins was also determined to be fixed contamination. The structural integrity of the building was evaluated without the affected purlins (removed due to fixed contamination). It was concluded that the purlins needed to remain in place until building demolition.

The areas on the purlins, identified as contaminated, have been marked with a bright florescent paint and recorded as being contaminated in a log controlled by the project manager. These contaminated purlins will remain in place until just prior to building demolition.

Remediation of the concrete was performed. All post-remedial surveys indicated that remediation activities were successful, and that all the affected concrete was removed.

Elevated levels of background radiation, from soil radioactivity, continued to be a presence during survey activities of Building 32.

Results from the final status survey of Building 32 provides evidence that release criteria have been met, demonstrates that residual radioactivity is below the unrestricted use criteria, and confirms that Building 32 is suitable for unrestricted use, excluding the contaminated purlins that will be removed just prior to building demolition.

Results of Surface Scans
Molycorp - Building 32 Survey Unit (Affected Area)

Building Floor

Location (see map)	Beta Scan gross cpm	Beta Scan net cpm	Alpha Scan gross cpm	Alpha Scan net cpm
F1	1600	-540	2	-16
F2	1800	-340	5	-13
F3	1800	-340	5	-13
F4	300	-1840	6	-12
F5	5500	3360	10	-8
F6	1600	-540	7	-11
F7	1600	-540	11	-7
F8	1800	-340	6	-12
F9	1500	-640	6	-12
F10	5000	2860	5	-13
F11	1500	-640	5	-13
F12	1700	-440	10	-8
F13	1600	-540	7	-11
F14	1700	-440	6	-12
F15	1800	-340	9	-9
F16	1700	-440	5	-13
F17	1600	-540	6	-12
F18	1700	-440	6	-12
F19	1800	-340	6	-12
F20	1800	-340	7	-11
F21	1700	-440	6	-12
F22	1800	-340	5	-13
F23	1600	-540	7	-11
F24	1700	-440	8	-10
F25	1600	-540	7	-11
F26	1700	-440	8	-10
F27	1600	-540	6	-12
F28	1500	-640	5	-13
F29	1800	-340	6	-12
F30	1700	-440	7	-11
F31	1800	-340	6	-12
F32	2000	-140	6	-12
F33	2200	60	5	-13
F34	2200	60	7	-11
F35	1800	-340	6	-12
F36	1800	-340	8	-10
F37	2000	-140	8	-10
F38	2800	660	5	-13
F39	2000	-140	7	-11
F40	1800	-340	10	-8
F41	3400	1260	10	-8
F42	1900	-240	5	-13
F43	2900	760	6	-12
F44	1600	-540	6	-12
F45	1500	-640	5	-13
F46	1700	-440	7	-11
F47	1800	-340	6	-12

F48	2500	360	8	-10
F49	1700	-440	7	-11
F50	1700	-440	7	-11
F51	7000	4860	6	-12
F52	1800	-340	8	-10
F53	3200	1060	6	-12
F54	1700	-440	7	-11
F55	1600	-540	6	-12
F56	2700	560	7	-11
F57	1800	-340	5	-13
F58	2700	560	7	-11
F59	1900	-240	9	-9
F60	1400	-740	5	-13
F61	1700	-440	5	-13
F62	1800	-340	12	-6
F63	1800	-340	6	-12
F64	1900	-240	14	-4
F65	2100	-40	10	-8
F66	1700	-440	9	-9
F67	1600	-540	6	-12
F68	1600	-540	5	-13
F69	1800	-340	12	-6
F70	2400	260	11	-7
F71	2900	760	10	-8
F72	1600	-540	6	-12
F73	8500	6360	9	-9
F74	2400	260	6	-12
F75	1700	-440	7	-11
F76	1700	-440	5	-13
F77	1900	-240	4	-14
F78	6500	4360	19	1
F79	1600	-540	9	-9
F80	1800	-340	6	-12
F81	1600	-540	6	-12
F82	1700	-440	7	-11
F83	5500	3360	11	-7
F84	1700	-440	5	-13
F85	1900	-240	12	-6
F86	1700	-440	7	-11
F87	1700	-440	5	-13
F88	1700	-440	9	-9
F89	1900	-240	10	-8
F90	5800	3660	10	-8

All floor scans performed with Ludlum 239-1F (2350-1 No.95359)
with 43-37 No. 92503

Floor Monitor Info:
Scan MDA Beta - 227 dpm/detector area
Scan MDA Alpha - 27 dpm/detector area
Scan background Beta - 2140 cpm
Scan background Alpha - 18 cpm
Detector Eff. Beta - .27
Detector Eff. Alpha - .207

Results of Surface Scans
Molycorp - Building 32 Survey Unit (Affected Area)

Building Walls (Interior)

Location (see map)	Beta Scan gross cpm	Beta Scan net cpm	Alpha Scan gross cpm	Alpha Scan net cpm
W1	280	-49	2	1.8
W2	300	-29	2	1.8
W3	270	-59	1	0.8
W4	305	-24	2	1.8
W5	305	-24	1	0.8
W6	320	-9	1	0.8
W7	305	-24	1	0.8
W8	310	-19	1	0.8
W9	300	-29	2	1.8
W10	260	-69	2	1.8
W11	290	-39	2	1.8
W12	300	-29	1	0.8
W13	330	1	1	0.8
W14	280	-49	1	0.8
W15	290	-39	1	0.8
W16	290	-39	1	0.8
W17	280	-49	2	1.8
W18	300	-29	2	1.8
W19	290	-39	2	1.8
W20	310	-19	1	0.8
W21	340	11	1	0.8
W22	340	11	2	1.8
W23	320	-9	6	5.8
W24	300	-29	2	1.8
W25	280	-49	2	1.8
W26	315	-14	2	1.8
W27	300	-29	2	1.8
W28	280	-49	6	5.8
W29	290	-39	5	4.8
W30	290	-39	1	0.8
W31	270	-59	2	1.8
W32	280	-49	2	1.8
W33	350	21	1	0.8
W34	330	1	3	2.8
W35	260	-69	2	1.8
W36	350	21	2	1.8
W37	290	-39	1	0.8
W38	290	-39	2	1.8
W39	290	-39	1	0.8
W40	280	-49	1	0.8
W41	290	-39	1	0.8
W42	300	-29	2	1.8
W43	280	-49	1	0.8
W44	270	-59	2	1.8
W45	270	-59	1	0.8
W46	200	-129	3	2.8
W47	275	-54	1	0.8

W48	260	-69	1	0.8
W49	275	-54	1	0.8
W50	280	-49	1	0.8
W51	310	-19	1	0.8
W52	270	-59	1	0.8
W53	290	-39	1	0.8
W54	300	-29	1	0.8
W55	310	-19	0	-0.2
W56	340	11	1	0.8
W57	350	21	0	-0.2
W58	4000	3671	57	56.8
W59	380	51	2	1.8
W60	420	91	2	1.8
W61	290	-39	0	-0.2
W62	400	71	1	0.8
W63	360	31	1	0.8
W64	370	41	1	0.8
W65	330	1	1	0.8
W66	370	41	1	0.8
W67	380	51	1	0.8
W68	390	61	1	0.8
W69	350	21	1	0.8
W70	340	11	6	5.8
W71	380	51	1	0.8
W72	290	-39	1	0.8
W73	300	-29	1	0.8
W74	310	-19	1	0.8
W75	280	-49	1	0.8
W76	340	11	2	1.8
W77	280	-49	1	0.8
W78	300	-29	2	1.8
W79	280	-49	1	0.8
W80	280	-49	2	1.8
W81	290	-39	1	0.8
W82	280	-49	1	0.8
W83	290	-39	1	0.8
W84	280	-49	2	1.8
W85	280	-49	1	0.8
W86	260	-69	1	0.8

All interior wall scans performed with Ludlum 2350-1 No.117566
with 43-106 No. 128912

43-106 Info:
Scan MDA Beta - 683 dpm/detector area
Scan MDA Alpha - 20 dpm/detector area
Scan background Beta - 329 cpm
Scan background Alpha - .2 cpm
Detector Eff. Beta - .251
Detector Eff. Alpha - .212

Results of Surface Scans
Molycorp - Building 32 Survey Unit (Affected Area)

Building Ceiling (Interior)

Location (see map)	Beta Scan gross cpm	Beta Scan net cpm	Alpha Scan gross cpm	Alpha Scan net cpm
C1	300	-10	0	-2
C2	320	10	2	0
C3	280	-30	1	-1
C4	320	10	0	-2
C5	350	40	1	-1
C6	340	30	1	-1
C7	300	-10	1	-1
C8	300	-10	2	0
C9	320	10	1	-1
C10	300	-10	1	-1
C11	300	-10	2	0
C12	300	-10	0	-2
C13	360	50	1	-1
C14	240	-70	0	-2
C15	280	-30	2	0
C16	320	10	0	-2

Ceiling scans performed with Ludlum 2350-1 No.117566 with 43-106 No. 128912

43-106 Info:
Scan MDA Beta - 686 dpm/detector area
Scan MDA Alpha - 63 dpm/detector area
Scan background Beta - 310 cpm
Scan background Alpha - 2 cpm
Detector Eff. Beta - .251
Detector Eff. Alpha - .212

Results of Surface Scans
Molycorp - Building 32 Survey Unit (Affected Area)

Building Exterior (Walls and Roof)

Location (see map)	Beta Scan gross cpm	Beta Scan net cpm	Alpha Scan gross cpm	Alpha Scan net cpm
W1	285	5	1	0
W2	280	0	0	-1
W3	310	30	1	0
W4	295	15	1	0
W5	305	25	2	1
W6	300	20	1	0
W7	300	20	2	1
W8	275	-5	0	-1
W9	325	45	1	0
W10	300	20	1	0
W11	315	35	1	0
W12	340	60	1	0
W13	310	30	2	1
W14	295	15	1	0
W15	280	0	1	0
W16	315	35	2	1
W17	305	25	2	1
W18	310	30	1	0
W19	320	40	1	0
W20	295	15	1	0
W21	300	20	2	1
W22	325	45	1	0
W23	290	10	1	0
W24	315	35	1	0
R1	332	52	1	0
R2	372	92	2	1

All exterior scans performed with Ludlum 2350-1 No.117566 with 43-106 No. 128912

43-106 Info:
Scan MDA Beta - 630 dpm/detector area
Scan MDA Alpha - 45 dpm/detector area
Scan background Beta - 280 cpm
Scan background Alpha - 1 cpm
Detector Eff. Beta - .251
Detector Eff. Alpha - .212

Elevated Scan Readings

Molycorp - Building 32 Survey Unit (Affected Area)

Location	Beta Scan (net cpm)	Alpha Scan (net cpm)
F51	4860	NA
F73	6360	NA
F78	4360	NA
W58 (I)	3671	56.8

Direct Measurements (Total Activity)
Molycorp - Building 32 Survey Unit (Affected Area)

Building Floor (Interior)

Location	Unshield Beta cpm	Shield Beta cpm	Gross Beta cpm	Bkgd cpm	Net cpm	Direct Beta (dpm/100cm2)	Uncertainty 95% CL	MDA (dpm/100cm2)	Direct Alpha (1) (dpm/100cm2)
F1	300	286	14	78	-64	-566	166	387	-1133
F2	341	275	66	78	-12	-106	208	387	-212
F3	320	302	18	78	-60	-531	170	387	-1062
F4	444	396	48	78	-30	-265	195	387	-531
F5	1332	336	996	78	918	8124	568	387	16248
F6	353	321	32	78	-46	-407	182	387	-814
F7	325	299	26	78	-52	-460	177	387	-920
F8	359	282	77	78	-1	-9	216	387	-18
F9	320	302	18	78	-60	-531	170	387	-1062
F10	1775	318	1457	78	1379	12204	680	387	24407
F11	452	264	188	78	110	973	283	387	1947
F12	409	319	90	78	12	106	225	387	212
F13	471	384	87	78	9	80	223	387	159
F14	411	297	114	78	36	319	240	387	637
F15	385	277	108	78	30	265	237	387	531
F16	343	285	58	78	-20	-177	202	387	-354
F17	337	314	23	78	-55	-487	174	387	-973
F18	445	359	86	78	8	71	222	387	142
F19	374	284	90	78	12	106	225	387	212
F20	408	234	174	78	96	850	275	387	1699
F21	351	302	49	78	-29	-257	195	387	-513
F22	299	277	22	78	-56	-496	173	387	-991
F23	342	278	64	78	-14	-124	207	387	-248
F24	406	311	95	78	17	150	228	387	301
F25	352	290	62	78	-16	-142	205	387	-283
F26	365	293	72	78	-6	-53	212	387	-106
F27	336	294	42	78	-36	-319	190	387	-637
F28	355	288	67	78	-11	-97	209	387	-195
F29	373	338	35	78	-43	-381	184	387	-761
F30	457	325	132	78	54	478	251	387	956
F31	265	299	-34	78	-112	-991	115	387	-1982
F32	373	327	46	78	-32	-283	193	387	-566

F33	395	356	39	78	-39	-345	188	387	-690
F34	461	373	88	78	10	88	223	387	177
F35	400	354	46	78	-32	-283	193	387	-566
F36	289	249	40	78	-38	-336	188	387	-673
F37	319	273	46	78	-32	-283	193	387	-566
F38	562	477	85	78	7	62	221	387	124
F39	414	332	82	78	4	35	219	387	71
F40	388	310	78	78	0	0	217	387	0
F41	710	291	419	78	341	3018	387	387	6035
F42	352	257	95	78	17	150	228	387	301
F43	705	605	100	78	22	195	231	387	389
F44	388	311	77	78	-1	-9	216	387	-18
F45	413	316	97	78	19	168	229	387	336
F46	387	319	68	78	-10	-88	210	387	-177
F47	409	303	106	78	28	248	235	387	496
F48	553	470	83	78	5	44	220	387	88
F49	406	350	56	78	-22	-195	201	387	-389
F50	451	349	102	78	24	212	233	387	425
F51	1216	325	891	78	813	7195	540	387	14389
F52	372	252	120	78	42	372	244	387	743
F53	668	566	102	78	24	212	233	387	425
F54	405	333	72	78	-6	-53	212	387	-106
F55	433	312	121	78	43	381	245	387	761
F56	565	311	254	78	176	1558	316	387	3115
F57	399	262	137	78	59	522	254	387	1044
F58	567	418	149	78	71	628	261	387	1257
F59	398	332	66	78	-12	-106	208	387	-212
F60	389	316	73	78	-5	-44	213	387	-88
F61	435	275	160	78	82	726	268	387	1451
F62	387	295	92	78	14	124	226	387	248
F63	460	370	90	78	12	106	225	387	212
F64	446	320	126	78	48	425	248	387	850
F65	470	295	175	78	97	858	276	387	1717
F66	533	328	205	78	127	1124	292	387	2248
F67	458	382	76	78	-2	-18	215	387	-35
F68	496	288	208	78	130	1150	293	387	2301
F69	396	327	69	78	-9	-80	210	387	-159
F70	458	274	184	78	106	938	281	387	1876
F71	631	307	324	78	246	2177	348	387	4354
F72	561	310	251	78	173	1531	315	387	3062

F73	2303	1934	369	78	291	2575	367	387	5150
F74	478	293	185	78	107	947	281	387	1894
F75	479	340	139	78	61	540	256	387	1080
F76	809	249	560	78	482	4265	438	387	8531
F77	866	288	578	78	500	4425	444	387	8850
F78	1444	1371	73	78	-5	-44	213	387	-88
F79	462	326	136	78	58	513	254	387	1027
F80	427	295	132	78	54	478	251	387	956
F81	587	266	321	78	243	2150	346	387	4301
F82	460	304	156	78	78	690	265	387	1381
F83	1299	1206	93	78	15	133	227	387	265
F84	529	309	220	78	142	1257	299	387	2513
F85	485	319	166	78	88	779	271	387	1558
F86	771	299	472	78	394	3487	407	387	6973
F87	647	281	366	78	288	2549	365	387	5097
F88	551	294	257	78	179	1584	317	387	3168
F89	487	355	132	78	54	478	251	387	956
F90	1392	380	1012	78	934	8265	573	387	16531

All building interior floor direct measurements were performed with 2360 No. 164680 and 43-89 No. 118544	Beta	Alpha
Floor Efficiency	0.113	0.164
Floor Background (cpm)	78	2.4
Floor MDA (dpm/100 cm2)	387	60

Direct Measurements (Total Activity)
Molycorp - Building 32 Survey Unit (Affected Area)

Building Walls (Interior)

Location	Unshield Beta cpm	Shield Beta cpm	Gross Beta cpm	Bkgd cpm	Net cpm	Direct Beta (dpm/100cm2)	Uncertainty 95% CL	MDA (dpm/100cm2)	Direct Alpha (1) (dpm/100cm2)	Instrument Number
W1	200	175	25	8	17	173	115	162	347	1
W2	191	186	5	8	-3	-31	72	162	-61	1
W3	204	206	-2	8	-10	-102	49	162	-204	1
W4	253	258	-5	8	-13	-133	35	162	-265	1
W5	252	272	-20	8	-28	-286	69	162	-571	1
W6	287	270	17	8	9	92	100	162	184	1
W7	257	220	37	8	29	296	134	162	592	1
W8	280	276	4	8	-4	-41	69	162	-82	1
W9	266	265	1	8	-7	-71	60	162	-143	1
W10	245	253	-8	8	-16	-163	0	162	-327	1
W11	219	249	-30	8	-38	-388	94	162	-776	1
W12	286	281	5	8	-3	-31	72	162	-61	1
W13	272	242	30	8	22	224	123	162	449	1
W14	264	244	20	8	12	122	106	162	245	1
W15	271	234	37	8	29	296	134	162	592	1
W16	291	283	8	8	0	0	80	162	0	1
W17	262	282	-20	8	-28	-286	69	162	-571	1
W18	242	203	39	8	31	316	137	162	633	1
W19	252	248	4	8	-4	-41	69	162	-82	1
W20	253	219	34	8	26	265	130	162	531	1
W21	253	264	-11	8	-19	-194	35	162	-388	1
W22	288	280	8	8	0	0	80	162	0	1
W23	248	250	-2	8	-10	-102	49	162	-204	1
W24	269	274	-5	8	-13	-133	35	162	-265	1
W25	292	262	30	8	22	224	123	162	449	1
W26	266	214	52	8	44	449	155	162	898	1
W27	303	250	53	8	45	459	156	162	918	1
W28	187	188	-1	8	-9	-92	53	162	-184	1
W29	283	264	19	8	11	112	104	162	224	1
W30	228	217	11	8	3	31	87	162	61	1
W31	222	220	2	8	-6	-61	63	162	-122	1
W32	225	220	5	8	-3	-31	72	162	-61	1
W33	229	210	19	8	11	112	104	162	224	1
W34	233	210	23	8	15	153	111	162	306	1

W35	234	222	12	8	4	41	89	162	82	1
W36	199	210	-11	8	-19	-194	35	162	-388	1
W37	235	234	1	8	-7	-71	60	162	-143	1
W38	273	286	-13	8	-21	-214	45	162	-429	1
W39	227	230	-3	8	-11	-112	45	162	-224	1
W40	236	200	36	8	28	286	133	162	571	1
W41	251	232	19	8	11	112	104	162	224	1
W42	282	286	-4	8	-12	-122	40	162	-245	1
W43	235	226	9	8	1	10	82	162	20	1
W44	277	238	39	8	31	316	137	162	633	1
W45	278	244	34	8	26	265	130	162	531	1
W46	284	240	44	8	36	367	144	162	735	1
W47	240	221	19	8	11	125	116	172	250	2
W48	231	210	21	8	13	148	120	172	295	2
W49	240	282	-42	8	-50	-568	130	172	-1136	2
W50	253	243	10	8	2	23	94	172	45	2
W51	256	230	26	8	18	205	130	172	409	2
W52	263	232	31	8	23	261	139	172	523	2
W53	280	265	15	8	7	80	107	172	159	2
W54	325	289	36	8	28	318	148	172	636	2
W55	293	315	-22	8	-30	-341	83	172	-682	2
W56	308	306	2	8	-6	-68	70	172	-136	2
W57	304	278	26	8	18	205	130	172	409	2
W58	1018	387	631	8	623	7080	563	172	14159	2
W59	275	309	-34	8	-42	-477	114	172	-955	2
W60	361	340	21	8	13	148	120	172	295	2
W61	311	294	17	8	9	102	111	172	205	2
W62	377	370	7	8	-1	-11	86	172	-23	2
W63	319	294	25	8	17	193	128	172	386	2
W64	325	282	43	8	35	398	159	172	795	2
W65	295	264	31	8	23	261	139	172	523	2
W66	273	291	-18	8	-26	-295	70	172	-591	2
W67	292	317	-25	8	-33	-375	92	172	-750	2
W68	314	299	15	8	7	80	107	172	159	2
W69	292	268	24	8	16	182	126	172	364	2
W70	300	276	24	8	16	182	126	172	364	2
W71	250	235	15	8	7	80	107	172	159	2
W72	256	256	0	8	-8	-91	63	172	-182	2
W73	253	249	4	8	-4	-45	77	172	-91	2
W74	263	258	5	8	-3	-34	80	172	-68	2
W75	260	270	-10	8	-18	-205	31	172	-409	2
W76	264	283	-19	8	-27	-307	74	172	-614	2
W77	245	261	-16	8	-24	-273	63	172	-545	2

W78	256	271	-15	8	-23	-261	59	172	-523	2
W79	246	269	-23	8	-31	-352	86	172	-705	2
W80	272	234	38	8	30	341	151	172	682	2
W81	228	242	-14	8	-22	-250	55	172	-500	2
W82	236	280	-44	8	-52	-591	134	172	-1182	2
W83	246	273	-27	8	-35	-398	97	172	-795	2
W84	279	256	23	8	15	170	124	172	341	2
W85	253	245	8	8	0	0	89	172	0	2
W86	242	231	11	8	3	34	97	172	68	2

All building interior wall direct measurements were performed with either:

#1 - 2360 No. 145469 and 43-89 No. 145391

	Beta	Alpha
Wall Efficiency	0.098	0.155
Wall Background (cpm)	8	3.7
Wall MDA (dpm/100 cm2)	162	75

OR

#2 - 2360 No. 156371 and 43-89 No. 164832

	Beta	Alpha
Wall Efficiency	0.088	0.153
Wall Background (cpm)	8	3.7
Wall MDA (dpm/100 cm2)	172	76

(1) - A beta to alpha ratio factoring (1:2, beta to alpha) was used to provide a more accurate alpha activity determination then sampling.

Direct Measurements (Total Activity)
Molycorp - Building 32 Survey Unit (Affected Area)

Building Ceiling (Interior)

Location	Unshield Beta cpm	Shield Beta cpm	Gross Beta cpm	Bkgd cpm	Net cpm	Direct Beta (dpm/100cm2)	Uncertainty 95% CL	MDA (dpm/100cm2)	Direct Alpha (1) (dpm/100cm2)
C1	257	246	11	8	3	34	97	180	68
C2	313	272	41	8	33	375	156	180	750
C3	265	289	-24	8	-32	-364	89	180	-727
C4	360	332	28	8	20	227	134	180	455
C5	357	336	21	8	13	148	120	180	295
C6	325	344	-19	8	-27	-307	74	180	-614
C7	300	303	-3	8	-11	-125	50	180	-250
C8	290	335	-45	8	-53	-602	135	180	-1205
C9	285	272	13	8	5	57	102	180	114
C10	309	306	3	8	-5	-57	74	180	-114
C11	292	319	-27	8	-35	-398	97	180	-795
C12	336	333	3	8	-5	-57	74	180	-114
C13	405	356	49	8	41	466	168	180	932
C14	360	365	-5	8	-13	-148	39	180	-295
C15	337	343	-6	8	-14	-159	31	180	-318
C16	339	368	-29	8	-37	-420	102	180	-841

All ceiling direct measurements were performed with 2360

	Beta	Alpha
No. 156371 and 43-89 No. 164832		
Ceiling Efficiency	0.088	0.153
Ceiling Background (cpm)	8	3.7
Ceiling MDA (dpm/100 cm2)	180	76

(1) - A beta to alpha ratio factoring (1:2, beta to alpha) was used to provide a more accurate alpha activity determination then sampling.

Direct Measurements (Total Activity)
Molycorp - Building 32 Survey Unit (Affected Area)

Building Exterior (Walls and Roof)

Location	Unshield Beta cpm	Shield Beta cpm	Gross Beta cpm	Bkgd cpm	Net cpm	Direct Beta (dpm/100cm2)	Uncertainty 95% CL	MDA (dpm/100cm2)	Direct Alpha (1) (dpm/100cm2)
W1	245	237	8	8	0	0	85	172	0
W2	252	258	-6	8	-14	-152	30	172	-304
W3	263	266	-3	8	-11	-120	48	172	-239
W4	261	253	8	8	0	0	85	172	0
W5	266	266	0	8	-8	-87	60	172	-174
W6	277	274	3	8	-5	-54	71	172	-109
W7	271	266	5	8	-3	-33	77	172	-65
W8	246	295	-49	8	-57	-620	136	172	-1239
W9	265	264	1	8	-7	-76	64	172	-152
W10	256	249	7	8	-1	-11	83	172	-22
W11	276	291	-15	8	-23	-250	56	172	-500
W12	255	277	-22	8	-30	-326	80	172	-652
W13	206	244	-38	8	-46	-500	117	172	-1000
W14	219	217	2	8	-6	-65	67	172	-130
W15	252	292	-40	8	-48	-522	121	172	-1043
W16	284	272	12	8	4	43	95	172	87
W17	296	320	-24	8	-32	-348	85	172	-696
W18	309	308	1	8	-7	-76	64	172	-152
W19	344	284	60	8	52	565	176	172	1130
W20	317	279	38	8	30	326	144	172	652
W21	284	282	2	8	-6	-65	67	172	-130
W22	270	265	5	8	-3	-33	77	172	-65
W23	298	343	-45	8	-53	-576	130	172	-1152
W24	300	327	-27	8	-35	-380	93	172	-761
R1	332	300	32	8	24	261	135	172	522
R2	372	376	-4	8	-12	-130	43	172	-261

All building exterior direct measurements were performed with 2224 No. 129463 and 43-89 No. 169230	Beta	Alpha
Efficiency	0.092	0.154
Background (cpm)	8	3.7
MDA (dpm/100 cm2)	172	76

(1) - A beta to alpha ratio factoring (1:2, beta to alpha) was used to provide a more accurate alpha activity determination then sampling.

Direct Measurements (Total Activity)
Molycorp - Building 32 Survey Unit (Affected Area)

Building Floor (Interior) After Remeidal Activities

Location	Unshield Beta cpm	Shield Beta cpm	Gross Beta cpm	Bkgd cpm	Net cpm	Direct Beta (dpm/100cm2)	Uncertainty 95% CL	MDA (dpm/100cm2)	Direct Alpha (1) (dpm/100cm2)
F5	399	292	107	78	29	330	303	497	659
F10	329	282	47	78	-31	-352	249	497	-705
F10	326	293	33	78	-45	-511	235	497	-1023
F11	427	340	87	78	9	102	286	497	205
F20	334	253	81	78	3	34	281	497	68
F41	398	290	108	78	30	341	304	497	682
F46	377	304	73	78	-5	-57	274	497	-114
F51	384	308	76	78	-2	-23	276	497	-45
F56	700	630	70	78	-8	-91	271	497	-182
F57	396	340	56	78	-22	-250	258	497	-500
F58	379	303	76	78	-2	-23	276	497	-45
F61	1204	1123	81	78	3	34	281	497	68
F65	376	305	71	78	-7	-80	272	497	-159
F66	983	872	111	78	33	375	306	497	750
F68	336	312	24	78	-54	-614	225	497	-1227
F70	342	284	58	78	-20	-227	260	497	-455
F71	377	297	80	78	2	23	280	497	45
F72	373	297	76	78	-2	-23	276	497	-45
F73	365	359	6	78	-72	-818	204	497	-1636
F73	347	302	45	78	-33	-375	247	497	-750
F74	314	300	14	78	-64	-727	214	497	-1455
F75	373	304	69	78	-9	-102	270	497	-205
F76	362	276	86	78	8	91	285	497	182
F77	357	290	67	78	-11	-125	268	497	-250
F77	359	331	28	78	-50	-568	229	497	-1136
F79	385	308	77	78	-1	-11	277	497	-23
F81	365	300	65	78	-13	-148	266	497	-295
F82	419	340	79	78	1	11	279	497	23
F84	435	348	87	78	9	102	286	497	205
F85	440	347	93	78	15	170	291	497	341
F86	328	272	56	78	-22	-250	258	497	-500

F87	394	310	84	78	6	68	283	497	136
F88	386	301	85	78	7	80	284	497	159
F90	416	318	98	78	20	227	295	497	455

All ceiling direct measurements were performed with 2360

No. 156371 and 43-89 No. 164832	Beta	Alpha
Ceiling Efficiency	0.088	0.153
Ceiling Background (cpm)	78	2.4
Ceiling MDA (dpm/100 cm2)	497	65

(1) - A beta to alpha ratio factoring (1:2, beta to alpha) was used to provide a more accurate alpha activity determination then sampling.

Elevated Direct Measurements (Total Activity) and Averaging Results
Molycorp - Building 32 Survey Unit (Affected Area)

Building Floor (Interior)

Location	Direct Beta (dpm/100cm^2)	Direct Alpha (dpm/100cm^2)	Over Area (cm^2)	Exceeds Limits Maximum	Exceeds Limits Average	Averaged Value (over 1 m^2)	Within Limits? Yes/No
F5	8124	16248		Yes	Yes	Remediated	NA
F10	12204	24407		Yes	Yes	Remediated	NA
F11	974	1947		No	Yes	Remediated	NA
F20	850	1699		No	Yes	Remediated	NA
F41	3018	6035		Yes	Yes	Remediated	NA
F51	7195	14389		Yes	Yes	Remediated	NA
F56	1558	3115		Yes	Yes	Remediated	NA
F57	522	1044		No	Yes	Remediated	NA
F58	638	1275		No	Yes	Remediated	NA
F61	726	1451		No	Yes	Remediated	NA
F65	859	1717		No	Yes	Remediated	NA
F66	1124	2248		No	Yes	Remediated	NA
F68	1151	2301		No	Yes	Remediated	NA
F70	938	1876		No	Yes	Remediated	NA
F71	2177	4354		Yes	Yes	Remediated	NA
F72	1531	3062		Yes	Yes	Remediated	NA
F73	2575	5150		Yes	Yes	Remediated	NA
F74	947	1894		No	Yes	Remediated	NA
F75	540	1080		No	Yes	Remediated	NA
F76	4266	8531		Yes	Yes	Remediated	NA
F77	4425	8850		Yes	Yes	Remediated	NA
F79	514	1027		No	Yes	Remediated	NA
F81	2151	4301		Yes	Yes	Remediated	NA
F82	691	1381		No	Yes	Remediated	NA
F84	1257	2513		No	Yes	Remediated	NA
F85	779	1558		No	Yes	Remediated	NA
F86	3487	6973		Yes	Yes	Remediated	NA
F87	2549	5097		Yes	Yes	Remediated	NA
F88	1584	3168		Yes	Yes	Remediated	NA
F90	8266	16531		Yes	Yes	Remediated	NA

Building Walls (Interior)

Location	Direct Beta ($dpm/100cm^2$)	Direct Alpha ($dpm/100cm^2$)	Over Area (cm^2)	Exceeds Limits Maximum	Exceeds Limits Average	Averaged Value (over 1 m^2)	Within Limits? Yes/No
W58	7080	14159	100	Yes	Yes	Marked for Removal	NA

Building Exterior (Walls and Roof)

Location	Direct Beta ($dpm/100cm^2$)	Direct Alpha ($dpm/100cm^2$)	Over Area (cm^2)	Exceeds Limits Maximum	Exceeds Limits Average	Averaged Value (over 1 m^2)	Within Limits? Yes/No
W19	NA	1130	100	No	Yes	456	Yes

Removable Surface Activity Measurements
Molycorp - Building 32 Survey Unit (Affected Area)

Building Floor

Location (see map)	Removable Beta (dpm/100cm^2)	Uncertainty 95% CL	MDA	Removable Alpha (dpm/100cm^2)	Uncertainty 95% CL	MDA	Instrument Number
F1	-6	16.2	152	-0.5	2.4	12.3	1
F2	-24	26.1	152	-0.5	2.4	12.3	1
F3	0	11.1	152	-0.5	2.4	12.3	1
F4	-67	41.0	152	-0.5	2.4	12.3	1
F5	18	23.3	152	-0.5	2.4	12.3	1
F6	-55	37.5	152	-0.5	2.4	12.3	1
F7	-6	16.2	152	-0.5	2.4	12.3	1
F8	91	47.4	152	2.4	5.2	12.3	1
F9	-6	16.2	152	-0.5	2.4	12.3	1
F10	-30	28.7	152	-0.5	2.4	12.3	1
F11	30	28.7	152	-0.5	2.4	12.3	1
F12	-109	51.6	152	5.3	7.7	12.3	1
F13	-61	39.3	152	2.4	5.2	12.3	1
F14	-24	26.1	152	2.4	5.2	12.3	1
F15	-91	47.4	152	-0.5	2.4	12.3	1
F16	-6	16.2	152	-0.5	2.4	12.3	1
F17	30	28.7	152	2.4	5.2	12.3	1
F18	12	20.1	152	-0.5	2.4	12.3	1
F19	42	33.2	152	-0.5	2.4	12.3	1
F20	61	39.3	152	-0.5	2.4	12.3	1
F21	24	26.1	152	2.4	5.2	12.3	1
F22	6	16.2	152	2.4	5.2	12.3	1
F23	-6	16.2	152	-0.5	2.4	12.3	1
F24	42	33.2	152	-0.5	2.4	12.3	1
F25	-42	33.2	152	-0.5	2.4	12.3	1
F26	-12	20.1	152	-0.5	2.4	12.3	1
F27	-48	35.2	152	2.4	5.2	12.3	1
F28	0	11.1	152	-0.5	2.4	12.3	1
F29	6	16.2	152	-0.5	2.4	12.3	1
F30	48	35.2	152	2.4	5.2	12.3	1
F31	30	28.7	152	-0.5	2.4	12.3	1
F32	-24	26.1	152	-0.5	2.4	12.3	1
F33	-42	33.2	152	-0.5	2.4	12.3	1
F34	-12	20.1	152	5.3	7.7	12.3	1
F35	-60	39.0	152	2.4	5.2	12.3	1
F36	0	11.1	152	-0.5	2.4	12.3	1
F37	-48	35.2	152	-0.5	2.4	12.3	1
F38	-18	23.3	152	2.4	5.2	12.3	1
F39	0	11.1	152	-0.5	2.4	12.3	1
F40	-30	28.7	152	-0.5	2.4	12.3	1
F41	-278	81.2	152	-0.5	2.4	12.3	1
F42	-278	81.2	152	-0.5	2.4	12.3	1
F43	-6	16.2	152	2.4	5.2	12.3	1
F44	12	20.1	152	-0.5	2.4	12.3	1
F45	0	11.1	152	2.4	5.2	12.3	1
F46	-42	33.2	152	-6	8.2	12.3	1
F47	-36	31.0	152	-0.5	2.4	12.3	1

F48	30	28.7	152	2.4	5.2	12.3	1
F49	-60	39.0	152	-0.5	2.4	12.3	1
F50	24	26.1	152	2.4	5.2	12.3	1
F51	6	16.2	152	-0.5	2.4	12.3	1
F52	-12	20.1	152	-0.5	2.4	12.3	1
F53	-24	26.1	152	2.4	5.2	12.3	1
F54	-24	26.1	152	2.4	5.2	12.3	1
F55	-48	35.2	152	2.4	5.2	12.3	1
F56	-48	35.2	152	2.4	5.2	12.3	1
F57	66	40.8	152	-0.5	2.4	12.3	1
F58	30	28.7	152	-0.5	2.4	12.3	1
F59	-42	33.2	152	2.4	5.2	12.3	1
F60	54	37.2	152	-0.5	2.4	12.3	1
F61	-30	28.7	152	2.4	5.2	12.3	1
F62	-30	28.7	152	2.4	5.2	12.3	1
F63	-12	20.1	152	-0.5	2.4	12.3	1
F64	-54	37.2	152	-0.5	2.4	12.3	1
F65	24	26.1	152	-0.5	2.4	12.3	1
F66	54	37.2	152	-0.5	2.4	12.3	1
F67	-42	33.2	152	2.4	5.2	12.3	1
F68	6	16.2	152	2.4	5.2	12.3	1
F69	-18	23.3	152	-0.5	2.4	12.3	1
F70	12	20.1	152	-0.5	2.4	12.3	1
F71	30	28.7	152	-0.5	2.4	12.3	1
F72	-36	31.0	152	-0.5	2.4	12.3	1
F73	12	20.1	152	-0.5	2.4	12.3	1
F74	-36	31.0	152	2.4	5.2	12.3	1
F75	30	28.7	152	2.4	5.2	12.3	1
F76	-18	23.3	152	-0.5	2.4	12.3	1
F77	12	20.1	152	2.4	5.2	12.3	1
F78	12	20.1	152	2.4	5.2	12.3	1
F79	18	23.3	152	-0.5	2.4	12.3	1
F80	48	35.2	152	2.4	5.2	12.3	1
F81	-66	40.8	152	-0.5	2.4	12.3	1
F82	-24	26.1	152	2.4	5.2	12.3	1
F83	30	28.7	152	-0.5	2.4	12.3	1
F84	66	40.8	152	-0.5	2.4	12.3	1
F85	-42	33.2	152	-0.5	2.4	12.3	1
F86	-42	33.2	152	-0.5	2.4	12.3	1
F87	-66	40.8	152	-0.5	2.4	12.3	1
F88	48	35.2	152	2.4	5.2	12.3	1
F89	-12	20.1	152	2.4	5.2	12.3	1
F90	12	20.1	152	2.4	5.2	12.3	1

#1 - Ludlum 2929 No. 152202 with 43-10 No. 156519 Info:

	Beta	Alpha
Background (cpm)	44	0.14
Bkgd ct. time	50	50
Sample ct. time	1	1
Efficiency	0.165	0.344
MDA	152	12.3

Removable Surface Activity Measurements
Molycorp - Building 32 Survey Unit (Affected Area)

Building Walls (Interior)

Location (see map)	Removable Beta (dpm/100cm^2)	Uncertainty 95% CL	MDA	Removable Alpha (dpm/100cm^2)	Uncertainty 95% CL	MDA	Instrument Number
W1	-78	44.0	152	-0.4	2.1	12.3	1
W2	24	26.1	152	-0.4	2.1	12.3	1
W3	-18	23.3	152	-0.4	2.1	12.3	1
W4	-36	31.0	152	-0.4	2.1	12.3	1
W5	12	20.1	152	-0.4	2.1	12.3	1
W6	-66	40.8	152	2.4	5.2	12.3	1
W7	-42	33.2	152	-0.4	2.1	12.3	1
W8	6	16.2	152	-0.4	2.1	12.3	1
W9	36	31.0	152	2.4	5.2	12.3	1
W10	-36	31.0	152	-0.4	2.1	12.3	1
W11	-24	26.1	152	-0.4	2.1	12.3	1
W12	-42	33.2	152	-0.4	2.1	12.3	1
W13	6	16.2	152	-0.4	2.1	12.3	1
W14	-60	39.0	152	-0.4	2.1	12.3	1
W15	-66	40.8	152	-0.4	2.1	12.3	1
W16	48	35.2	152	2.4	5.2	12.3	1
W17	-66	40.8	152	-0.4	2.1	12.3	1
W18	6	16.2	152	-0.4	2.1	12.3	1
W19	-6	16.2	152	-0.4	2.1	12.3	1
W20	-109	51.6	152	-0.4	2.1	12.3	1
W21	-48	35.2	152	2.4	5.2	12.3	1
W22	-78	44.0	152	5.5	7.8	12.3	1
W23	-48	35.2	152	2.4	5.2	12.3	1
W24	-25	26.6	152	2.2	5.0	12.3	1
W25	79	44.3	152	2.2	5.0	12.3	1
W26	50	35.9	152	-0.6	2.6	12.3	1
W27	63	39.9	152	-0.6	2.6	12.3	1
W28	8	17.6	152	-0.6	2.6	12.3	1
W29	-46	34.6	152	-0.6	2.6	12.3	1
W30	-17	22.8	152	2.2	5.0	12.3	1
W31	-78	44.0	152	-0.4	2.1	12.3	1
W32	-24	26.1	152	-0.4	2.1	12.3	1
W33	0	11.1	152	-0.4	2.1	12.3	1
W34	30	28.7	152	-0.4	2.1	12.3	1
W35	-54	37.2	152	-0.4	2.1	12.3	1
W36	-60	39.0	152	-0.4	2.1	12.3	1
W37	48	35.2	152	-0.4	2.1	12.3	1
W38	-42	33.2	152	-0.4	2.1	12.3	1
W39	-42	33.2	152	2.4	5.2	12.3	1
W40	-54	37.2	152	2.4	5.2	12.3	1
W41	-24	26.1	152	-0.4	2.1	12.3	1
W42	24	26.1	152	2.4	5.2	12.3	1
W43	-12	20.1	152	2.4	5.2	12.3	1
W44	-6	16.2	152	-0.4	2.1	12.3	1
W45	-30	28.7	152	2.4	5.2	12.3	1
W46	6	16.2	152	-0.4	2.1	12.3	1

W47	12	20.1	152	-0.5	2.4	12.3	1
W48	-12	20.1	152	-0.5	2.4	12.3	1
W49	18	23.3	152	5.3	7.7	12.3	1
W50	-24	26.1	152	2.4	5.2	12.3	1
W51	-48	35.2	152	-0.5	2.4	12.3	1
W52	-24	26.1	152	-0.5	2.4	12.3	1
W53	-48	35.2	152	2.4	5.2	12.3	1
W54	42	33.2	152	-0.5	2.4	12.3	1
W55	-6	16.2	152	2.4	5.2	12.3	1
W56	42	33.2	152	-0.5	2.4	12.3	1
W57	-42	33.2	152	2.4	5.2	12.3	1
W58	54	37.2	152	2.4	5.2	12.3	1
W59	-24	26.1	152	2.4	5.2	12.3	1
W60	78	44.0	152	-0.5	2.4	12.3	1
W61	-6	16.2	152	2.4	5.2	12.3	1
W62	-109	51.6	152	2.4	5.2	12.3	1
W63	36	31.0	152	26.0	17.0	12.3	1
W64	36	31.0	152	2.4	5.2	12.3	1
W65	12	20.1	152	2.4	5.2	12.3	1
W66	-6	16.2	152	2.4	5.2	12.3	1
W67	12	20.1	152	2.4	5.2	12.3	1
W68	-60	39.0	152	0.5	2.4	12.3	1
W69	0	11.1	152	-0.5	2.4	12.3	1
W70	-48	35.2	152	2.4	5.2	12.3	1
W71	-18	23.3	152	-0.5	2.4	12.3	1
W72	42	33.2	152	-0.5	2.4	12.3	1
W73	-30	28.7	152	-0.5	2.4	12.3	1
W74	-79	44.3	152	5.3	7.7	12.3	1
W75	30	28.7	152	-0.5	2.4	12.3	1
W76	-90	47.1	152	2.4	5.2	12.3	1
W77	0	11.1	152	-0.5	2.4	12.3	1
W78	25	26.6	152	2.4	5.2	12.3	1
W79	60	39.0	152	5.0	7.5	12.3	1
W80	30	28.7	152	-0.5	2.4	12.3	1
W81	36	31.0	152	-0.5	2.4	12.3	1
W82	-5.8	16.1	152	-0.5	2.4	12.3	1
W83	42	33.2	152	-0.5	2.4	12.3	1
W84	36	31.0	152	-0.5	2.4	12.3	1
W85	30	28.7	152	5.3	7.7	12.3	1
W86	-24	26.1	152	5.3	7.7	12.3	1

#1 - Ludlum 2929 No. 152202 with 43-10 No. 156519 Info:

	Beta	Alpha
Background (cpm)	44	0.14
Bkgd ct. time	50	50
Sample ct. time	1	1
Efficiency	0.165	0.344
MDA	152	12.3

Removable Surface Activity Measurements
Molycorp - Building 32 Survey Unit (Affected Area)

Building Ceiling (Interior)

Location (see map)	Removable Beta (dpm/100cm2)	Uncertainty 95% CL	MDA	Removable Alpha (dpm/100cm2)	Uncertainty 95% CL	MDA	Instrument Number
C1	-66	40.8	155	2.1	4.9	12.6	1
C2	12	20.1	155	2.1	4.9	12.6	1
C3	18	23.3	155	-0.7	2.8	12.6	1
C4	54	37.2	155	-0.7	2.8	12.6	1
C5	24	26.1	155	-0.7	2.8	12.6	1
C6	-36	31.0	155	-0.7	2.8	12.6	1
C7	-54	37.2	155	-0.7	2.8	12.6	1
C8	24	26.1	155	2.1	4.9	12.6	1
C9	36	31.0	155	2.1	4.9	12.6	1
C10	-18	23.3	155	-0.7	2.8	12.6	1
C11	18	23.3	155	-0.7	2.8	12.6	1
C12	54	37.2	155	-0.7	2.8	12.6	1
C13	6	16.2	155	2.1	4.9	12.6	1
C14	-18	23.3	155	2.1	4.9	12.6	1
C15	66	40.8	155	2.1	4.9	12.6	1
C16	-36	31.0	155	-0.7	2.8	12.6	1

#1 - Ludlum 2929 No. 152202 with 43-10 No. 156519 Info:

	Beta	Alpha
Background (cpm)	46	0.16
Bkgd ct. time	50	50
Sample ct. time	1	1
Efficiency	0.165	0.344
MDA	155	12.6

Removable Surface Activity Measurements
Molycorp - Building 32 Survey Unit (Affected Area)

Building Exterior (Walls and Roof)

Location (see map)	Removable Beta (dpm/100cm2)	Uncertainty 95% CL	MDA	Removable Alpha (dpm/100cm2)	Uncertainty 95% CL	MDA	Instrument Number
W1	33	25	129	-0.4	2.1	12.1	1
W2	29	24	129	2.0	4.7	12.1	1
W3	0	10	129	2.0	4.7	12.1	1
W4	13	17	129	-0.4	2.1	12.1	1
W5	-59	32	129	-0.4	2.1	12.1	1
W6	17	19	129	5.0	7.4	12.1	1
W7	-67	34	129	-0.4	2.1	12.1	1
W8	29	24	129	2.0	4.7	12.1	1
W9	-25	22	129	2.0	4.7	12.1	1
W10	4	13	129	-0.4	2.1	12.1	1
W11	29	24	129	2	4.7	12.1	1
W12	-21	21	129	-0.4	2.1	12.1	1
W13	-24	26	152	2.1	4.9	14	2
W14	24	26	152	0.7	2.8	14	2
W15	-36	31	152	5	7.5	14	2
W16	-30	29	152	-0.7	2.8	14	2
W17	109	52	152	-0.7	2.8	14	2
W18	96	49	152	-0.7	2.8	14	2
W19	12	20	152	2	4.7	14	2
W20	30	29	152	-0.3	1.9	14	2
W21	18	23	152	-0.7	2.8	14	2
W22	-30	29	152	0.5	2.4	14	2
W23	6	16	152	2	4.7	14	2
W24	18	23	152	-0.7	2.8	14	2
R1	18	23	152	2	4.7	14	2
R2	-24	26	152	0.7	2.8	14	2

#1 - Ludlum 2929 No. 115563 with 43-10 No. 127216 Info:

	Beta	Alpha
Background (cpm)	70	0.14
Bkgd ct. time	50	50
Sample ct. time	1	1
Efficiency	0.239	0.35
MDA	129	12.1

#2 - Ludlum 2929 No. 152202 with 43-10 No. 156519 Info (3-6):

	Beta	Alpha
Background (cpm)	44	0.26
Bkgd ct. time	50	50
Sample ct. time	1	1
Efficiency	0.165	0.344
MDA	152	14

Elevated Removable Surface Activity Measurements
Molycorp - Building 32 Survey Unit (Affected Area)

No elevated removable surface activity was reported above limits.

Exposure Rate Measurements
Molycorp - Building 32 Survey Unit (Affected Area)

Building Floor

Location	Exposure Rate (uR/hr)	Net Exp Rate (uR/hr)	Exposure Rate After Remediation Activities* Exposure Rate (uR/hr)	Net Exp Rate (uR/hr)
F1	11	0		
F2	11	0		
F3	11	0		
F4	17	6		
F5	12	1	12	1
F6	12	1		
F7	13	2		
F8	13	2		
F9	13	2		
F10	14	3	12	1
F11	15	4	12	1
F12	12	1		
F13	12	1		
F14	13	2		
F15	13	2		
F16	15	4		
F17	15	4		
F18	15	4		
F19	14	3		
F20	13	2	12	1
F21	13	2		
F22	13	2		
F23	13	2		
F24	13	2		
F25	13	2		
F26	14	3		
F27	13	2		
F28	15	4		
F29	15	4		
F30	15	4		
F31	15	4		
F32	14	3		
F33	14	3		
F34	15	4		
F35	15	4		
F36	14	3		
F37	13	2		
F38	16	5		
F39	17	6		
F40	16	5		
F41	16	5	15	4
F42	15	4		
F43	17	6		
F44	18	7		
F45	16	5		

F46	15	4	15	4
F47	15	4		
F48	20	9		
F49	18	7		
F50	17	6		
F51	16	5	15	4
F52	17	6		
F53	23	12		
F54	16	5		
F55	17	6		
F56	16	5	15	4
F57	14	3	22	11
F58	19	8	20	9
F59	17	6		
F60	16	5		
F61	16	5	14	3
F62	15	4		
F63	18	7		
F64	18	7		
F65	18	7	15	4
F66	16	5	20	9
F67	15	4		
F68	17	6	22	11
F69	18	7		
F70	18	7	15	4
F71	15	4	20	9
F72	15	4	22	11
F73	38	27	22	11
F74	16	5	24	13
F75	15	4	24	13
F76	17	6	20	9
F77	18	7	22	11
F78	38	27		
F79	16	5	16	5
F80	16	5		
F81	14	3	20	9
F82	14	3	24	13
F83	38	27		
F84	17	6	24	13
F85	17	6	16	5
F86	14	3	20	9
F87	15	4	16	5
F88	15	4	14	3
F89	15	4		
F90	15	4	16	5

Background dose rate: 11 uR/hr with Model 19, No.22526

* Exposure rates taken in remediated sample locations only.

Exposure Rate Measurements
Molycorp - Building 32 Survey Unit (Affected Area)

Building Walls (Interior)

Location	Exposure Rate (uR/hr)	Net Exp Rate (uR/hr)
W1	15	4
W2	11	0
W3	11	0
W4	10	-1
W5	10	-1
W6	10	-1
W7	10	-1
W8	11	0
W9	11	0
W10	14	3
W11	14	3
W12	14	3
W13	15	4
W14	15	4
W15	15	4
W16	15	4
W17	16	5
W18	16	5
W19	16	5
W20	16	5
W21	16	5
W22	15	4
W23	15	4
W24	14	3
W25	14	3
W26	14	3
W27	14	3
W28	14	3
W29	13	2
W30	13	2
W31	13	2
W32	13	2
W33	13	2
W34	13	2
W35	13	2
W36	13	2
W37	13	2
W38	13	2
W39	13	2
W40	13	2
W41	13	2
W42	13	2
W43	13	2

W44	13	2
W45	13	2
W46	13	2
W47	7	-4
W48	7	-4
W49	7	-4
W50	7	-4
W51	7	-4
W52	8	-3
W53	6	-5
W54	7	-4
W55	8	-3
W56	10	-1
W57	9	-2
W58	16	5
W59	9	-2
W60	13	2
W61	11	0
W62	14	3
W63	10	-1
W64	10	-1
W65	9	-2
W66	9	-2
W67	9	-2
W68	9	-2
W69	8	-3
W70	10	-1
W71	8	-3
W72	8	-3
W73	8	-3
W74	10	-1
W75	10	-1
W76	10	-1
W77	10	-1
W78	10	-1
W79	10	-1
W80	10	-1
W81	10	-1
W82	10	-1
W83	8	-3
W84	8	-3
W85	9	-2
W86	6	-5

Background dose rate: 11 uR/hr with Model 19, No.22526

Exposure Rate Measurements
Molycorp - Building 32 Survey Unit (Affected Area)

Building Ceiling (Interior)

Location	Exposure Rate (uR/hr)	Net Exp Rate (uR/hr)
C1	5	-6
C2	9	-2
C3	9	-2
C4	12	1
C5	10	-1
C6	12	1
C7	10	-1
C8	10	-1
C9	9	-2
C10	9	-2
C11	10	-1
C12	10	-1
C13	11	0
C14	12	1
C15	10	-1
C16	11	0

Background dose rate: 11 uR/hr with Model 19, No.22526

Exposure Rate Measurements
Molycorp - Building 32 Survey Unit (Affected Area)

Building Exterior (Walls)

Location	Exposure Rate (uR/hr)	Net Exp Rate (uR/hr)
W1	12	0
W2	12	0
W3	12	0
W4	13	1
W5	13	1
W6	13	1
W7	14	2
W8	14	2
W9	13	1
W10	14	2
W11	13	1
W12	13	1
W13	9	-3
W14	9	-3
W15	9	-3
W16	10	-2
W17	11	-1
W18	12	0
W19	11	-1
W20	11	-1
W21	12	0
W22	11	-1
W23	11	-1
W24	13	1

Background dose rate: 11 uR/hr with Model 19, No.22526

Exposure Rate Measurements
Molycorp - Building 32 Survey Unit (Affected Area)

Building Exterior (Roof)

Location	Exposure Rate (uR/hr)	Net Exp Rate (uR/hr)
R1	11	0
R2	14	3
see map	10	-1
see map	10	-1
see map	10	-1
see map	12	1
see map	12	1
see map	12	1
see map	14	3
see map	14	3
see map	12	1
see map	13	2
see map	12	1
see map	14	3
see map	12	1
see map	13	2
see map	12	1
see map	14	3

Background dose rate: 11 uR/hr with Model 19, No.22526

Summary of Building Surface Direct Reading (Total Activity) Results
Molycorp - Building 32 Survey Unit (Affected Area)

Including all building interior and exterior measurements

Beta				Alpha			
n	$\bar{x}$	s	μ_α	n	$\bar{x}$	s	μ_α
220	-49	271.1	-19.1	220	-99	542.1	-38.2

$t_{1-\alpha}$ 1.654

Guidelines/Conditions Satisfied?

Beta	Alpha
Yes	Yes

Summary of Exposure Rate Measurements
Molycorp - Building 32 Survey Unit (Affected Area)

Including all building interior and exterior measurements (uR/hr)

n	$\bar{x}$	s	μ_α
234	2.3	4.3	2.7

$t_{1-\alpha}$ 1.654

Guidelines/Conditions Satisfied?
Yes

	DDO-138 Radiation Protection Survey Report	Site: Molycorp / Washington, PA

Section 1: Survey Information

Date:	Time:	Location:	Survey Issue Log Number:
3-5-02	1500	Bldg 32	02-0052

RWP Number:	Purpose of Survey:	Page
N/A	☐ RWP ☐ Routine Survey ☐ Unconditional Release ☒ Other:	1 of 18

Survey Title: Bldg 32 I/S Floor & walls

N/A

Bkgd Readings:

Smear Number	Beta dpm/100cm²	Alpha dpm/100cm²
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13	N	
14		A
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		

Legend:

00 = mRem/h gamma | 00 C = mRem/h gamma contact | ① = Smear Location | ▽ = Air Sample Location | -X-X-X- = Rope, Boundary, or Barrier

00 β = mRem/h beta | 00 βC = mRem/h beta contact | --①-- = Large Area Wipe | ⁝⁝ = Bulk Material Sample

Section 2: Instrument Used

Instrument Model/SN:	Cal Due Date:	Probe Model/SN:	Cal Due Date:	Detector Eff.: (cpm/dpm)	MDA:	Other Bkgd
2360/164680	7-9-02	43-89/118544	8-6-02	α.164 β.113	α60 β387	α2.4 β78
19/22526	8-6-02	N/A	N/A	N/A	N/A	11 mrem
2929/152202	2-6-03	43-10/156519	2-6-03	α.344 β.165	α12 β206	α.14 β44
2350-1/95359	8-6-02	43-37/092503	8-6-02	α.207 β.27	α27 β227	α18 β2140
2350-1/117566	8-6-02	43-106/128912	8-6-02	α.212 β.251	α20 β683	α.2 β329

Section 3: Review and Approval

Survey Performed By (Sign):	Area Posted and/or Barricaded:	Date and Time:
[signature]	☐ Yes ☐ No ☒ Not Required	3-5-02 1500
Radiation Safety Officer (Print Name & Sign): Mike McDonald [signature]		Date and Time: 3-14-02 9:30

Radiological Survey Results - Survey Location Indicator

Survey Area Information:

Instrument Data	Instrument Model/SN	Cal Due	Probe Model/SN	Cal Due	α Scan MDA	β Scan MDA	α Static MDA	β Static MDA
	2360/164640	7-9-02	43-89/118544	8-6-02	N/A	N/A	60	387
	model 19/22526	8-6-02	N/A					→
	2929/152202	2-6-03	43-10/156519	2-6-03		~~212~~ 1ST	15	212
	2350-1/95359	8-6-02	43-37/092503	8-6-02	27	227	N/A	N/A

Performed By:	Print Name	Signature	Date
	Justin Trevino	Justin Trevino	3-6-02
	Dennis Whitlock	[illegible]	3-6-02

Location	β Scan (cpm)	α Scan (cpm)	β Static (unsh) (cpm)	β Static (sh) (cpm)	α Static (cpm)	ER (μrem/hr)	Smears (dpm/100 cm²) α	Smears (dpm/100 cm²) β
F-1	1600	2	360	286	5	11	-0.4	-6
F-2	1800	5	341	275	5	11	-0.4	-24
F-3	1800	5	320	302	5	11	-0.4	0
F-4	300	6	444	396	5	17	-0.4	-67
F-5	5500	10	1332	336	14	12	-0.4	18
F-6	1600	7	353	321	3	12	-0.4	-55
F-7	1600	11	325	299	5	13	-0.4	-6
F-8	1800	6	359	282	4	13	2.4	91
F-9	1500	6	320	302	4	13	-0.4	-6
F-10	5000	5	1225	318	29	14	-0.4	-30
F-11	1500	5	452	264	4	15	-0.4	30
F-12	1700	10	409	319	4	12	5.3	-109
F-13	1600	7	471	384	7	12	2.4	-61
F-14	1700	6	411	297	12	13	2.4	-24
F-15	1800	9	385	277	11	13	-0.4	-91
F-16	1700	5	343	285	2	15	-0.4	-6
F-17	1600	6	337	314	8	15	2.4	30
F-18	1700	6	445	359	6	15	-0.4	12
F-19	1800	6	374	284	3	14	-0.4	42
F-20	1800	7	408	234	2	13	-0.4	61
F-21	1700	6	351	302	6	13	2.4	24
F-22	1800	5	299	277	6	13	2.4	6
F-23	1600	7	342	278	7	13	-0.4	-6
F-24	1700	8	406	311	2	13	-0.4	42
F-25	1600	7	352	290	1	13	-0.4	-42
F-26	1700	8	365	293	6	14	-0.4	-12
F-27	1600	6	336	294	5	13	2.4	-48

Radiological Survey Results - Survey Location Indicator

Survey Area Information:

Instrument Data	Instrument Model/SN	Cal Due	Probe Model/SN	Cal Due	α Scan MDA	β Scan MDA	α Static MDA	β Static MDA
		N				N		
		A				A		

Performed By:	Print Name	Signature	Date

Location	β Scan (cpm)	α Scan (cpm)	β Static (unsh) (cpm)	β Static (sh) (cpm)	α Static (cpm)	ER (μrem/hr)	Smears (dpm/100 cm²) α	Smears (dpm/100 cm²) β
F-28	1500	5	355	288	5	15	-0.4	0
F-29	1800	6	373	338	5	15	-0.4	6
F-30	1700	7	457	325	7	15	2.4	48
F-31	1800	6	265	299	4	15	-0.4	30
F-32	2000	6	373	327	7	14	-0.4	-24
F-33	2200	5	395	356	8	14	-0.4	-42
F-34	2200	7	461	373	7	15	5.3	-12
F-35	1800	6	400	354	6	15	2.4	-60
F-36	1800	8	289	249	5	14	-0.4	0
F-37	2000	8	319	273	5	13	-0.4	-48
F-38	2800	5	562	477	4	16	2.4	-18
F-39	2600	7	414	322	4	17	-0.4	0
F-40	1400	10	388	316	14	16	-0.4	-30
F-41	3400	10	710	291	14	16	-0.4	-278
F-42	1900	5	352	257	4	15	-0.4	-278
F-43	2900	6	745	605	9	17	2.4	-6
F-44	1600	6	388	311	13	18	-0.4	12
F-45	1500	5	413	316	15	16	2.4	0
F-46	1700	7	387	319	7	15	-6	-42
F-47	1800	6	409	303	8	15	-0.4	-36
F-48	2500	8	553	470	6	20	2.4	30
F-49	1700	7	406	350	10	18	-0.4	-60
F-50	1700	7	451	349	15	17	2.4	24
F-51	7000	6	1216	325	49	16	-0.4	6
F-52	1800	8	372	252	12	17	-0.4	-12
F-53	3200	6	668	566	6	23	2.4	-24
F-54	1700	7	465	333	16	16	2.4	-24

Radiological Survey Results - Survey Location Indicator

Survey Area Information:

Instrument Data	Instrument Model/SN	Cal Due	Probe Model/SN	Cal Due	α Scan MDA	β Scan MDA	α Static MDA	β Static MDA
		N				N		
		A				A		

Performed By:	Print Name	Signature	Date

Location	β Scan (cpm)	α Scan (cpm)	β Static (unsh) (cpm)	β Static (sh) (cpm)	α Static (cpm)	ER (μrem/hr)	Smears (dpm/100 cm²) α	Smears (dpm/100 cm²) β
F-55	1600	6	433	312	23	17	2.4	-48
F-56	2700	7	565	311	40	16	2.4	-48
F-57	1800	5	399	262	16	14	-0.4	66
F-58	2700	7	567	418	13	19	-0.4	30
F-59	1900	9	398	332	26	17	2.4	-42
F-60	1400	5	389	316	12	16	-0.4	54
F-61	1700	5	435	275	15	16	2.4	-30
F-62	1800	12	387	295	13	15	2.4	-30
F-63	1800	6	460	370	10	18	-0.4	-12
F-63 QC	1700	7	472	387	13	20	-0.4	-48
F-64	1900	14	443	320	11	18	-0.4	-54
F-65	2100	10	470	295	25	18	-0.4	24
F-66	1700	9	533	328	11	16	-0.4	54
F-67	1600	6	458	382	11	15	2.4	-42
F-68	1600	5	496	288	11	17	2.4	6
F-69	1800	12	396	327	25	18	-0.4	-18
F-70	2400	11	458	274	12	18	-0.4	12
F-71	2900	10	631	307	49	15	-0.4	30
F-72	1600	6	561	310	13	15	-0.4	-36
F-73	8500	9	2303	1934	18	38	-0.4	12
F-74	2400	6	478	293	16	16	2.4	-36
F-75	1700	7	479	340	22	15	2.4	30
F-76	1700	5	809	249	58	17	-0.4	-18
F-77	1900	4	866	288	13	18	2.4	12
F-78	6500	19	1444	1371	21	38	2.4	12
F-79	1600	9	462	326	16	16	-0.4	18
F-80	1800	6	427	295	16	16	2.4	48
F-81	1600	6	587	266	40	14	-0.4	-66

Radiological Survey Results - Survey Location Indicator

Survey Area Information:

Instrument Data	Instrument Model/SN	Cal Due	Probe Model/SN	Cal Due	α Scan MDA	β Scan MDA	α Static MDA	β Static MDA

N A

Performed By:	Print Name	Signature	Date

Location	β Scan (cpm)	α Scan (cpm)	β Static (unsh) (cpm)	β Static (sh) (cpm)	α Static (cpm)	ER (μrem/hr)	Smears (dpm/100 cm²) α	Smears (dpm/100 cm²) β
F-82	1700	7	460	304	18	14	2.4	-24
F-83	5500	11	1299	1206	14	38	-0.4	30
F-84	1700	5	529	309	26	17	-0.4	66
F-85	1900	12	485	319	30	17	-0.4	-42
F-86	1700	7	771	299	50	14	-0.4	-42
F-87	1700	5	647	281	30	15	-0.4	-66
F-88	1700	9	551	294	25	15	2.4	48
F-89	1900	10	487	355	23	15	2.4	-12
F-90	5800	10	1392	380	90	15	2.4	12

N A

Radiological Survey Results - Calculational Sheet

Location	β Static (unsh) (cpm)	β Static (sh) (cpm)	Gross β	Minus Bkgd = (Net β)	Net β dpm/100 cm²
F-1	360	286	74	-4	-35
F-2	341	275	66	-12	-90
F-3	320	302	18	-60	-530
F-4	444	396	48	-30	-265
F-5	1332	336	996	918	8123
F-6	353	321	32	-46	-407
F-7	325	299	26	-52	-460
F-8	359	282	77	-1	-9
F-9	320	302	18	-60	-530
F-10	1775	318	1457	1379	12,203
F-11	452	264	188	110	973
F-12	409	319	90	12	106
F-13	471	384	87	9	79
F-14	411	297	114	36	318
F-15	385	277	108	30	265
F-16	343	285	58	-20	-176
F-17	337	314	23	-55	-486
F-18	445	359	86	8	71
F-19	374	284	90	12	106
F-20	408	234	174	96	849
F-21	351	302	49	-29	-256
F-22	299	277	22	-56	-495
F-23	342	278	64	-14	-123
F-24	406	311	95	17	150
F-25	352	290	62	-16	-141
F-26	365	293	59	-19	-168
F-27	336	294	42	-36	-318
		N	A		

Instrument Model/SN:	Probe Model/SN:	Detector Eff.: (cpm/dpm)
2360/164680	HB-89/118544	β⁻ .113%
	N	A

Material	Bkgd
Concrete Floor	β 78 α 2.4
	N A

Radiological Survey Results - Calculational Sheet

Location	β Static (unsh) (cpm)	β Static (sh) (cpm)	Gross β	Minus Bkgd = (Net β)	Net β dpm/100 cm²
F-28	355	288	67	-11	-97
F-29	373	338	35	-43	-380
F-30	457	325	132	54	477
F-31	265	299	-34	-112	-991
F-32	373	327	46	-32	-283
F-33	395	356	39	-39	-345
F-34	461	373	88	10	88
F-35	400	354	46	-32	-283
F-36	289	249	40	-38	-336
F-37	319	273	46	-32	-283
F-38	562	477	85	7	61
F-39	414	332	82	4	35
F-40	386	310	78	0	0
F-41	710	291	419	341	3017
F-42	352	257	95	17	150
F-43	705	605	100	22	194
F-44	388	311	77	-1	-8
F-45	413	316	97	19	168
F-46	387	319	68	-10	-88
F-47	409	303	106	28	247
F-48	553	470	83	5	44
F-49	406	350	56	-22	-194
F-50	451	349	102	24	212
F-51	1216	325	891	813	7194
F-52	372	252	120	42	371
F-53	668	566	102	24	212
F-54	405	333	72	-6	-53

N A

Instrument Model/SN:	Probe Model/SN:	Detector Eff.: (cpm/dpm)

N A

Material	Bkgd

N A

Radiological Survey Results - Calculational Sheet

Location	β Static (unsh) (cpm)	β Static (sh) (cpm)	Gross β	Minus Bkgd = (Net β)	Net β dpm/100 cm²
F-55	433	312	121	43	380
F-56	565	311	254	176	1557
F-57	399	262	137	59	522
F-58	567	418	149	71	628
F-59	398	332	66	-12	-106
F-60	389	316	73	-5	-44
F-61	435	275	160	82	725
F-62	387	295	92	14	123
F-63	460	370	90	12	106
F-63 QC	472	387	85	7	61
F-64	443	320	123	45	398
F-65	470	295	175	97	858
F-66	533	328	205	127	1123
F-67	458	382	76	-2	-17
F-68	496	288	208	130	1150
F-69	396	327	69	-9	-69
F-70	458	274	184	106	963
F-71	631	307	324	246	2176
F-72	561	310	251	173	1530
F-73	2303	1934	369	291	2575
F-74	478	293	185	107	946
F-75	479	340	139	61	539
F-76	809	249	560	482	4820
F-77	866	288	578	500	4424
F-78	1444	1371	73	-5	-44
F-79	462	326	136	58	513
F-80	427	295	132	54	477
F-81	587	266	321	243	2150

Instrument Model/SN:	Probe Model/SN:	Detector Eff.: (cpm/dpm)
	N	
	A	

Material	Bkgd
N	
	A

Radiological Survey Results - Calculational Sheet

Location	β Static (unsh) (cpm)	β Static (sh) (cpm)	Gross β	Minus Bkgd = (Net β)	Net β dpm/100 cm²
F-82	460	304	156	78	690
F-83	1299	1206	93	15	132
F-84	529	309	220	142	1256
F-85	485	319	166	88	778
F-86	771	299	472	394	3486
F-87	647	281	366	288	2548
F-88	551	294	257	179	1584
F-~~80~~ 89	487	355	132	54	477
F-90	1392	380	1012	934	8265

N A

Instrument Model/SN:	Probe Model/SN:	Detector Eff.: (cpm/dpm)

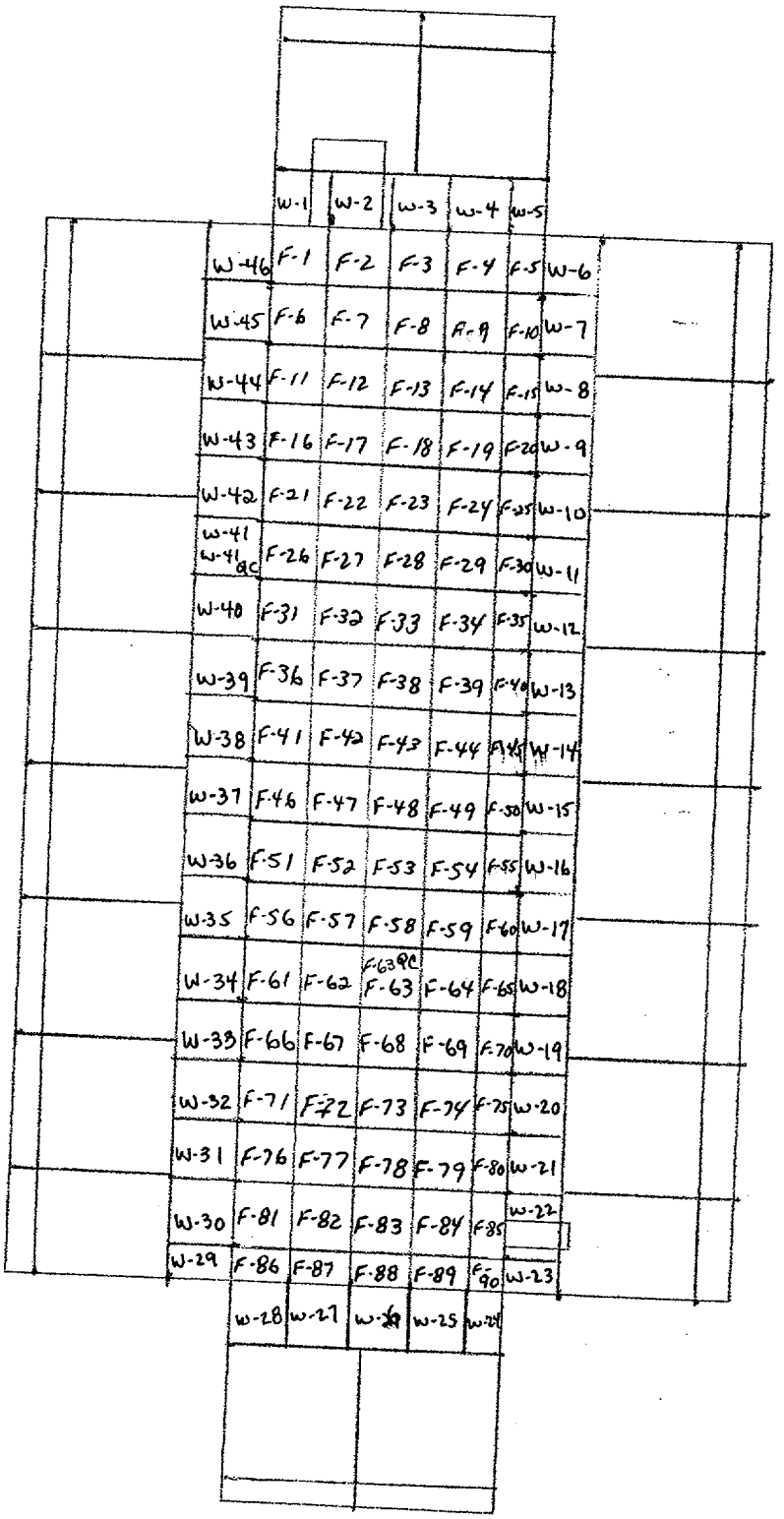
N A

Material	Bkgd

N A

Building 32

North



Scale:
4m x 4m

Interior

Radiological Survey Results - Survey Location Indicator

Survey Area Information:

Instrument Data	Instrument Model/SN	Cal Due	Probe Model/SN	Cal Due	α Scan MDA	β Scan MDA	α Static MDA	β Static MDA
	2929/152202	2-6-02	4310/156519	2-6-03	—	—	12	206
	2360/145469	7-10-02	43-89/145391	7-14-02	—	—	75	162
	2350-1/117566	8-6-02	43106/128912	8-6-02	20	683	—	—
	14/115870	8-6-02	N		N		N	
	N/A	N/A	A			A		A

Performed By:	Print Name	Signature	Date
	MARK BLANCIAK	Mark Blanciak	3-5-02
	TammiE S. Darby	Tammie S Darby	

Location	β Scan (cpm)	α Scan (cpm)	β Static (unsh) (cpm)	β Static (sh) (cpm)	α Static (cpm)	ER (μrem/hr)	Smears (dpm/100 cm²) α	Smears (dpm/100 cm²) β
W-1	280	2	–	–	1	15	-0.4	-78
W-2	300	2	–	–	1	11	-.4	24
W-3	270	1	–	–	2	11	-.4	-18
W-4	305	2	–	–	6	10	-.4	-36
W-5	305	1	–	–	1	10	-.4	12
W-6	320	1	–	–	0	10	2.4	-66
W-7	305	1	–	–	0	10	-.4	-42
W-8	310	1	–	–	3	11	-.4	6
W-9	300	2	–	–	0	11	2.4	36
W-10	260	2	–	–	6	14	-.4	-36
W-11	290	2	–	–	3	14	-.4	-24
W-12	300	1	–	–	0	14	-.4	-42
W-13	330	1	–	–	1	15	-.4	6
W-14	280	1	–	–	0	15	-.4	-60
W-15	290	1	–	–	4	15	-.4	-66
W-16	290	1	–	–	4	15	2.4	48
W-17	280	2	–	–	2	16	-.4	-66
W-18	300	2	–	–	0	16	-.4	6
W-19	290	2	–	–	2	16	-.4	-6
W-20	310	1	–	–	0	16	-.4	-109
W-21	340	1	–	–	3	16	2.4	-48
W-22	340	2	–	–	6	15	5.5	-78
W-23	320	6	–	–	1	15	2.4	-48
W-24	300	2	–	–	1	14	2.2	-25
W-25	280	2	–	–	1	14	2.2	79
W-26	315	2	–	–	5	14	-.4	50
W-27	300	2	–	–	5	14	-.4	63

Radiological Survey Results - Survey Location Indicator

Survey Area Information:

Instrument Data	Instrument Model/SN	Cal Due	Probe Model/SN	Cal Due	α Scan MDA	β Scan MDA	α Static MDA	β Static MDA
	2929/152202	2-6-03	43-10/156519	2-6-03	—	—	12	206
	2360/145469	7-10-02	43-89/145391	7-14-02	—	—	75	1662
	2350-1/117566	8-6-02	43-106/128912	8-6-02	20	6083	—	—
	19/115870	8-6-02	N/A		N/A	N/A	N/A	N/A
	N/A	N/A						

Performed By:	Print Name	Signature	Date
	MARK BLANCIAK	Mark Blanciak	3-5-02
	Tammie S. Darby	Tammie S. Darby	

Location	β Scan (cpm)	α Scan (cpm)	β Static (unsh) (cpm)	β Static (sh) (cpm)	α Static (cpm)	ER (μrem/hr)	Smears (dpm/100 cm²) α	Smears (dpm/100 cm²) β
W-28	280	6	—	—	4	14	-0.4	8
W-29	290	5	—	—	4	13	-0.4	-46
W-30	290	1	—	—	2	13	2.2	-17
W-31	270	2	—	—	2	13	-.4	-78
W-32	280	2	—	—	5	13	-.4	-24
W-33	350	1	—	—	3	13	-.4	0
W-34	330	3	—	—	3	13	-.4	30
W-35	260	2	—	—	0	13	-.4	-54
W-36	350	2	—	—	2	13	-.4	-60
W-37	290	1	—	—	2	13	-.4	48
W-38	290	2	—	—	1	13	-.4	-42
W-39	290	1	—	—	6	13	2.4	-42
W-40	280	1	—	—	4	13	2.4	-54
W-41	290	1	—	—	4	13	-.4	-24
W-41 QC	290	1	—	—	5	13	-.4	-90
W-42	300	2	—	—	2	13	2.4	24
W-43	280	1	—	—	3	13	2.4	-12
W-44	270	2	—	—	6	13	-.4	-6
W-45	270	1	—	—	3	13	2.4	-30
W-46	200	3	—	—	0	13	-.4	6
W-47	275	.4	—	—	1	7	-.4	12
W-48	260	.7	—	—	1	7	-.4	-12
W-49	275	1	—	—	1	7	+5.3	18
W-50	280	.5	—	—	0	7	2.4	-24
W-51	310	1	—	—	1	7	-.4	-48
W-52	270	1	—	—	3	8	-.4	-24
W-53	290	.5	—	—	0	6	2.4	-48

Radiological Survey Results - Survey Location Indicator

Survey Area Information:

	Instrument Model/SN	Cal Due	Probe Model/SN	Cal Due	α Scan MDA	β Scan MDA	α Static MDA	β Static MDA
Instrument Data	2360/156371	8-15-02	43-89/164832	8-5-02	N/A	N/A	76	172
	N					N		
		A					A	

	Print Name	Signature	Date
Performed By:	MARK BLANCIAK	Mark Blanciak	3-5-02
	DENNIS whitlock	[illegible]	3-5-02

Location	β Scan (cpm)	α Scan (cpm)	β Static (unsh) (cpm)	β Static (sh) (cpm)	α Static (cpm)	ER (μrem/hr)	Smears (dpm/100 cm²) α	Smears (dpm/100 cm²) β
W-54	300	.4	–	–	5	7	-.4	42
W-55	310	0	–	–	1	8	2.4	-6
W-55 QC	305	0	–	–	2	8	2.4	24
W-56	340	1	–	–	0	10	-.4	42
W-57	350	0	–	–	0	9	2.4	-42
W-58	4000	57	–	–	35	16	2.4	54
W-59	380	2	–	–	2	9	2.4	-24
W-60	420	2	–	–	0	13	-.4	78
W-61	290	0	–	–	2	11	2.4	-6
W-62	400	1	–	–	4	14	2.4	-109
W-63	360	.8	–	–	12	10	26	36
W-64	370	1	–	–	2	10	2.4	36
W-65	330	.5	–	–	2	9	2.4	12
W-66	370	.5	–	–	3	9	2.4	-6
W-67	380	1	–	–	2	9	2.4	12
W-68	390	1	–	–	1	9	.4	-60
W-69	350	1	–	–	0	8	-.4	0
W-70	340	6	–	–	2	10	2.4	-48
W-71	280	1	–	–	2	8	-.4	-18
W-72	290	1	–	–	0	8	-.4	42
W-73	300	1	–	–	0	8	-.4	-30
W-74	310	1	–	–	0	10	5.3	-79
W-75	280	.8	–	–	0	10	-.4	30
W-76	340	2	–	–	0	10	2.4	-90
W-77	280	1	–	–	1	10	-.4	0
W-78	300	2	–	–	2	10	2.4	25
W-79	280	1	–	–	1	10	5	60

Radiological Survey Results - Survey Location Indicator

Survey Area Information:

Instrument Data	Instrument Model/SN	Cal Due	Probe Model/SN	Cal Due	α Scan MDA	β Scan MDA	α Static MDA	β Static MDA

N/A

Performed By:	Print Name	Signature	Date
	MARK BLANCIAK	Mark Blanciak	3-5-02
	DENNIS WHITLOCK	[illegible]	3-5-02

Location	β Scan (cpm)	α Scan (cpm)	β Static (unsh) (cpm)	β Static (sh) (cpm)	α Static (cpm)	ER (μrem/hr)	Smears (dpm/100 cm²) α	Smears (dpm/100 cm²) β
W-80	280	2	–	–	0	10	-.4	30
W-81	290	.6	–	–	0	10	-.4	36
W-82	280	1	–	–	1	10	-.4	-5.8
W-83	290	1	–	–	1	8	-.4	42
W-84	280	2	–	–	1	8	-.4	36
W-85	280	1	–	–	1	9	5.3	30
W-86	260	.8	–	–	1	6	5.3	-24

N/A

Radiological Survey Results - Calculational Sheet

Location	β Static (unsh) (cpm)	β Static (sh) (cpm)	Gross β	Minus Bkgd = (Net β)	Net β dpm/100 cm²
W 1	200	175	25	17	173
W 2	191	186	5	-3	-31
W 3	204	206	-2	-10	-102
W 4	253	258	-5	-13	-133
W 5	252	272	-20	-28	-286
W 6	287	270	17	9	92
W 7	257	220	37	29	296
W 8	280	276	4	-4	-41
W 9	266	265	1	-7	-71
W 10	245	253	-8	-16	-163
W 11	219	249	-30	-38	-388
W 12	286	281	5	-3	-31
W 13	272	242	30	22	225
W 14	264	244	20	12	122
W 15	271	234	37	29	296
W 16	291	283	8	0	0
W 17	262	282	-20	-28	-286
W 18	242	203	39	31	316
W 19	252	248	4	-4	-41
W 20	253	219	34	26	265
W 21	253	264	-11	-19	-194
W 22	288	280	8	0	0
W 23	248	250	-2	-10	-102
W 24	269	274	-5	-13	-132
W 25	292	262	30	22	224
W 26	266	214	52	44	448
W 27	303	250	53	45	459
W 28	187	188	-1	-9	-91
W 29	283	264	19	11	112
W 30	228	217	11	3	31
W 31	222	220	22	14	142

Instrument Model/SN:	Probe Model/SN:	Detector Eff.: (cpm/dpm)
2360/145469	43-89/145391	α.155 β.098
	N	A

Material	Bkgd
Wall	β 8/α 3.7
	N
	A

Radiological Survey Results - Calculational Sheet

Location	β Static (unsh) (cpm)	β Static (sh) (cpm)	Gross β	Minus Bkgd = (Net β)	Net β dpm/100 cm²
W 32	225	220	5	-3	-31
W 33	229	210	19	11	112
W 34	233	210	23	15	153
W 35	234	222	12	4	41
W 36	199	210	-11	-19	-193
W 37	235	234	1	-7	-71
W 38	273	286	-13	-21	-214
W 39	227	230	-3	-11	-112
W 40	236	200	36	28	286
W 41	251	232	19	11	112
W 41 QC	220	221	9	1	10
W 42	282	286	-4	-12	-122
W 43	235	226	9	1	10
W 44	277	238	39	31	316
W 45	276	244	32	24	245
W 46	284	240	44	36	367
W-47	240	221	19	11	125
W-48	231	210	21	13	148
W-49	240	282	-42	-50	-568
W-50	253	243	10	2	23
W-51	256	230	26	18	205
W-52	263	232	31	23	261
W-53	280	265	15	7	80
W-54	325	289	36	28	318
W-55	293	315	-22	-30	-341
W-55 QC	305	269	36	28	318
W 56	308	306	2	-6	-68
W 57	304	278	26	18	205
W 58	1018	387	631	623	7080 *
W 59	275	309	-34	-42	-477
W 60	361	340	21	13	148

Instrument Model/SN:	Probe Model/SN:	Detector Eff.: (cpm/dpm)
2360/145469	43-89/145391	α .155 β .098
2360/156371	43-89/164832	α .153 β .088
	N	
	A	

Material	Bkgd
Wall	B-8 3.7
N	A

Radiological Survey Results - Calculational Sheet

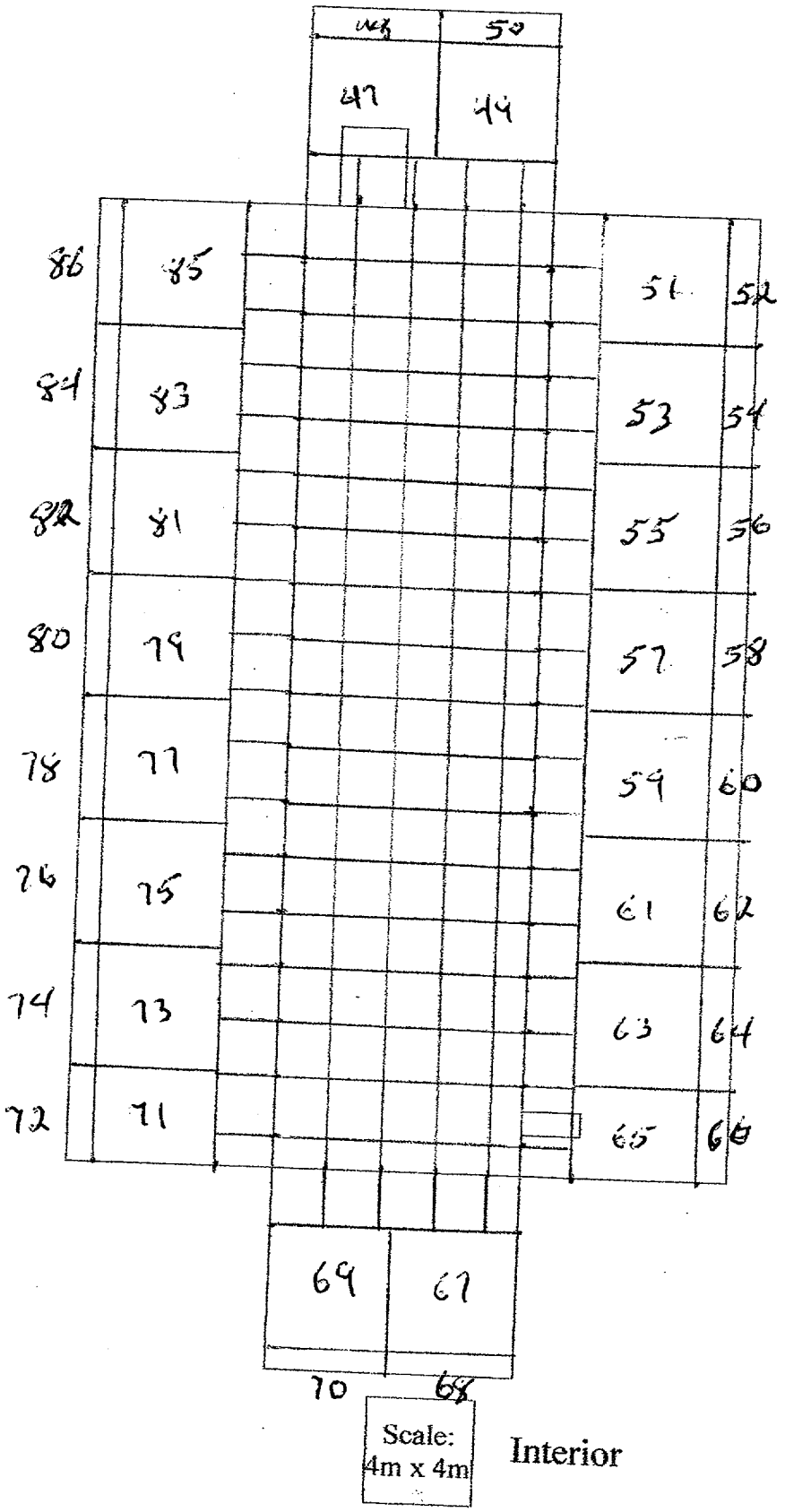
Location	β Static (unsh) (cpm)	β Static (sh) (cpm)	Gross β	Minus Bkgd = (Net β)	Net β dpm/100 cm²
W 61	311	294	17	9	102
W 62	377	370	7	-1	-11
W 63	319	294	25	17	193
W 64	325	282	43	35	398
W 65	295	264	31	23	261
W 66	273	291	-18	-26	-295
W 67	292	317	-25	-33	-375
W 68	314	299	15	7	80
W 69	292	268	24	-16	-182
W 70	300	276	24	-16	-182
W 71	250	235	15	7	80
W 72	256	256	0	-8	91
W 73	253	249	4	-4	-45
W 74	263	258	5	-3	-34
W 75	260	271	-11	-3	-34
W 76	264	283	-19	-11	-125
W 77	245	261	-16	-8	-91
W 78	256	271	-15	-7	-80
W 79	246	269	-23	-31	-352
W 80	272	234	38	30	341
W 81	228	242	-14	-22	-250
W 82	236	280	-44	-52	-591
W 83	246	273	-27	-35	-398
W 84	279	256	23	15	170
W 85	253	245	8	0	0
W 86	242	231	11	3	34
		N	A		

Instrument Model/SN:	Probe Model/SN:	Detector Eff.: (cpm/dpm)
2360/156371	43-89/164832	α .153 β .088
	N	
	A	

Material	Bkgd
GENERIC	α 3.7 β 8
N	
A	

Building 32

North



DDO-138 Radiation Protection Survey Report

Site: Molycorp / Washington, PA

Section 1: Survey Information

Date:	Time:	Location:	Survey Issue Log Number:
3-6-02	1300	Bldg 32	02-0053

RWP Number: N/A

Purpose of Survey: ☐ RWP ☐ Routine Survey ☐ Unconditional Release ☒ Other:

Page 1 of 4

Survey Title: Bldg 32 CEILING (AFFECTED)

N A

Smear Number	Beta dpm/100cm²	Alpha dpm/100cm²
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13	N	
14		A
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		

Bkgd Readings:

Legend:
00 = mRem/h gamma; 00 C = mRem/h gamma contact; ① = Smear Location; ▽ = Air Sample Location; -X-X-X- = Rope, Boundary, or Barrier
00 β = mRem/h beta; 00 βC = mRem/h beta contact; –①– = Large Area Wipe; ⬚ = Bulk Material Sample

Section 2: Instrument Used

Instrument Model/SN:	Cal Due Date:	Probe Model/SN:	Cal Due Date:	Detector Eff.: (cpm/dpm)	MDA:	Other BKG
2929/152202	2-6-03	4310/156519	2-6-03	α .344 β⁻ .165	α 14 β⁻ 206	α .26 β⁻ = 44
2360/156371	8-15-02	4389/164832	8-5-02	α .153 β⁻ .088	α 16 β⁻ 180	α 3.7 β⁻ = 8
2350-1/117566	8-6-02	43-106/128912	8-6-02	α .212 β⁻ .251	α 63 β⁻ 686	α 2 β⁻ 310
19/115870	8-6-02	N				N
N/A	N/A		A			A

Section 3: Review and Approval

Survey Performed By (Sign):	Area Posted and/or Barricaded:	Date and Time:
Mark Blancuik	☐ Yes ☐ No ☒ Not Required	3-6-02 1300
Radiation Safety Officer (Print Name & Sign): Mike McDonald		Date and Time: 3-14-02 9:30

Radiological Survey Results - Survey Location Indicator

Survey # 02-0053

Survey Area Information:

	Instrument Model/SN	Cal Due	Probe Model/SN	Cal Due	α Scan MDA	β Scan MDA	α Static MDA	β Static MDA
Instrument Data	23-60 156371	8-15-02	4389 164832	8-5-02	—	—	~~18~~ 76	180
	N	A				N	A	

Performed By:	Print Name	Signature	Date
	MARK BLANCIAK	Mark Blanciak	3-6-02

Location	β Scan (cpm)	α Scan (cpm)	β Static (unsh) (cpm)	β Static (sh) (cpm)	α Static (cpm)	ER (μrem/hr)	Smears (dpm/100 cm²) α	Smears (dpm/100 cm²) β
C-1	300	0	257	246	4	5	2.1	-66
C-2	320	2.0	313	272	3	9	2.1	12
C-3	280	0.6	265	289	0	9	-0.7	18
C-4	320	0	360	332	3	12	-0.7	54
C-5	350	0.8	357	336	2	10	-0.7	24
C-6	340	1.0	325	344	2	12	-0.7	-36
C-7	300	0.6	300	303	2	10	-0.7	-54
C-7 QC	300	0	320	339	0	10	-0.7	12
C-8	300	2.0	290	335	2	10	2.1	24
C-9	320	1.0	285	272	3	9	2.1	36
C-10	300	1.0	309	306	2	9	-0.7	-18
C-11	300	2.0	292	319	0	10	-0.7	18
C-12	300	0	336	333	1	10	-0.7	54
C-13	360	1.0	405	356	3	11	2.1	6
C-14	240	0	360	365	0	12	2.1	-18
C-15	280	2.0	337	343	1	10	2.1	66
C-16	320	0	339	368	4	11	-0.7	-36
				N	A			

Radiological Survey Results - Calculational Sheet

SURVEY # 02-0053

Location	β Static (unsh) (cpm)	β Static (sh) (cpm)	Gross β	Minus Bkgd = (Net β)	Net β dpm/100 cm²
C-1	257	246	11	3	34
C-2	313	272	41	33	375
C-3	265	289	-24	-32	-363
C-4	360	332	28	20	227
C-5	357	336	21	13	147
C-6	325	344	-19	-27	-306
C-7	300	303	-3	-11	-125
C-7 QC	320	339	-19	-27	-306
C-8	290	335	-45	-53	-602
C-9	285	272	13	5	56
C-10	309	306	3	-5	-56
C-11	292	319	-27	-35	-397
C-12	336	333	3	-5	-56
C-13	405	356	49	41	465
C-14	360	365	-5	-13	-147
C-15	337	343	-6	-14	-159
C-16	339	368	-29	-37	-420
		N	A		

Instrument Model/SN:	Probe Model/SN:	Detector Eff.: (cpm/dpm)
23-60 156371	4389 164832	.088β, .153α
	N	A

Material	Bkgd
Wall	β=8 3.7α
N	A

SURVEY # 02-0053

Building 32

North

C-1	C-9
C-2	C-10
C-3	C-11
C-4	C-12
C-5	C-13
C-6	C-14
C-7 C-7QC	C-15
C-8	C-16

Ceiling

Scale:
4m x 4m

	DDO-138 Radiation Protection Survey Report	Site: Molycorp / Washington, PA

Section 1: Survey Information

Date:	Time:	Location:	Survey Issue Log Number:
3-5-02	1430	o/s WALLS Bldg 32	02-0054

RWP Number:	Purpose of Survey:	Page
N/A	☐ RWP ☐ Routine Survey ☐ Unconditional Release ☒ Other:	1 of 4

Survey Title:

2929 # 152202 43-10 # 156519 WAS USED ON 3-6-02 to COUNT SMEARS W13-24 & R142

CAL DUE - 2-6-03 EFF α .344 β⁻ .165

MDA α 14 β⁻ 206 Bkgd α .26 β⁻ 44

2929 α .14 β⁻ 70 2350-1 α 1 β⁻ 280

Bkgd Readings: 2224-1 α 3.7 β⁻ 8 model 19 12uR/HR

Smear Number	Beta dpm/100cm²	Alpha dpm/100cm²
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13	N	
14		A
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		

Legend:

00 = mRem/h gamma | 00 C = mRem/h gamma contact | ① = Smear Location | ▽ = Air Sample Location | -X-X-X- = Rope, Boundary, or Barrier

00 β = mRem/h beta | 00 βC = mRem/h beta contact | –①– = Large Area Wipe | ⬚ = Bulk Material Sample

Section 2: Instrument Used

Instrument Model/SN:	Cal Due Date:	Probe Model/SN:	Cal Due Date:	Detector Eff.: (cpm/dpm)	MDA:	Other
2350/117566	8-6-02	43-106/128912	8-6-02	α .212 β⁻ .251	α 45 β⁻ 630	
2224/129463	8-6-02	43-89/169230	8-6-02	α .154 β⁻ .092	α 76 β⁻ 172	
2929/115563	6-19-02	43-10/127216	6-19-02	α .35 β⁻ .239	α 11 β⁻ 176	N
19/22526	8-6-02	N	N	N	N	A
N/A	N/A	A	A	A	A	

Section 3: Review and Approval

Survey Performed By (Sign):	Area Posted and/or Barricaded:	Date and Time:
[signature]	☐ Yes ☐ No ☒ Not Required	3-5-02 1430
Radiation Safety Officer (Print Name & Sign): Mike McDonald [signature]		Date and Time: 3-14-02 9:30

Radiological Survey Results - Survey Location Indicator

Survey #02-0054

Survey Area Information:

Instrument Data	Instrument Model/SN	Cal Due	Probe Model/SN	Cal Due	α Scan MDA	β Scan MDA	α Static MDA	β Static MDA
	2350/117566	8-6-02	43-106/128912	8-6-02	45	630	N/A	N/A
	2224/129463	8-6-02	43-89/169230	8-6-02	N/A	N/A	76	172
	2929/115563	6-19-02	43-10/127216	6-19-02	N/A	N/A	11	176
	19/22526	8-6-02	N		N		N	
	N/A	N/A	A			A		A

Performed By:	Print Name	Signature	Date
	DENNIS Whitlock	[signature]	3-5-02

Location	β Scan (cpm)	α Scan (cpm)	β Static (unsh) (cpm)	β Static (sh) (cpm)	α Static (cpm)	ER (μrem/hr)	Smears (dpm/100 cm²) α	Smears (dpm/100 cm²) β
W-1	285	1	245	237	2	12	-.4	33
W-2	280	0	252	258	5	12	2	29
W-3	310	.5	263	266	5	12	2	0
W-4	295	.9	261	263	2	13	-.4	13
W-5	305	2	266	266	3	13	-.4	-59
W-6	300	1.4	277	274	1	13	5	17
W-7	300	2	271	266	2	14	-.4	-67
W-7 QC	310	2	267	250	6	14	-.4	17
W-8	275	0	246	295	5	14	2	29
W-9	325	.7	265	264	4	13	2	-25
W-10	300	.5	256	249	5	14	-.4	4
W-11	315	1	276	291	6	13	2	29
W-12	340	1	255	277	4	13	-.4	-21
W-13	310	1.5	206	244	6	9	2.1	-24
W-14	295	.8	219	217	4	9	.7	24
W-15	280	.5	252	292	4	9	5	-36
W-16	315	1.5	284	272	0	10	-.7	-30
W-17	305	1.8	296	320	2	11	-.7	109
W-18	310	1	309	308	8	12	-.7	96
W-19	320	1.2	344	284	1	11	2	12
W-20	295	1	317	279	2	11	-.7	30
W-21	300	2	284	282	3	12	-.7	18
W-22	325	.6	270	265	4	11	.5	-30
W-23	290	.5	298	343	0	11	2	6
W-24	315	.8	300	327	4	13	-.7	18
R-1	330	1	332	300	10	11	2	18
R-2	320	2	372	376	10	14	.7	-24

Radiological Survey Results - Calculational Sheet

Survey # 02-0054

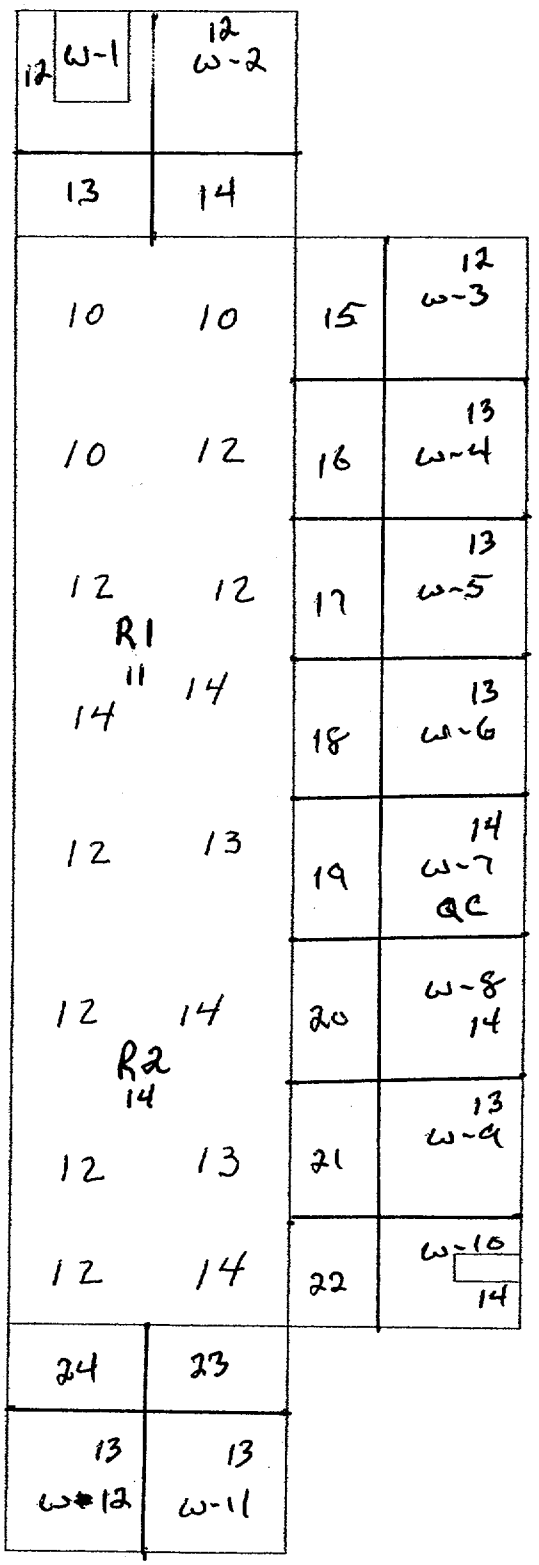
Location	β Static (unsh) (cpm)	β Static (sh) (cpm)	Gross β	Minus Bkgd = (Net β)	Net β dpm/100 cm²
W-1	245	237	8	0	0
W-2	252	258	-6	-14	-152
W-3	263	266	-3	-11	-120
W-4	261	253	8	0	0
W-5	266	266	0	-8	-87
W-6	277	274	3	-5	-54
W-7	271	266	5	-3	-33
W-7 QC	267	250	17	9	98
W-8	246	295	-49	-57	-620
W-9	265	264	1	-7	-76
W-10	256	249	7	-1	-11
W-11	276	291	-15	-23	-250
W-12	255	277	-22	-30	-326
W-13	206	244	-38	-46	-500
W-14	219	217	2	-6	-65
W-15	252	292	-40	-48	-522
W-16	284	272	12	4	43
W-17	296	320	-24	-32	-348
W-18	309	308	1	-7	-76
W-19	344	284	60	52	565
W-20	317	279	38	30	326
W-21	284	282	2	-6	-65
W-22	270	265	5	-3	-33
W-23	298	343	-45	-53	-576
W-24	300	327	-27	-35	-380
R-1	332	300	32	24	261
R-2	372	376	-4	-12	130
		N			
			A		

Instrument Model/SN:	Probe Model/SN:	Detector Eff.: (cpm/dpm)
2224/129463	43-89/169230	α .154 β⁻ .092
	N	
	A	

Material	Bkgd
GENERIC	α 3.7 β⁻ 8
N	
A	

Building 32

North



Scale: 4m x 4m

Exterior

	DDO-138 Radiation Protection Survey Report	Site: Molycorp / Washington, PA

Section 1: Survey Information

Date:	Time:	Location:	Survey Issue Log Number:
4-10-02	0900	Bldg 32	02-0107

RWP Number:	Purpose of Survey:	Page 1 of 4
N/A	☐ RWP ☐ Routine Survey ☐ Unconditional Release ☒ Other:	

Survey Title: Post Remediation Survey

upper perlins on the north, east & south walls will be removed & stored in an RMA prior to Bldg Demolition

Smear Number	Beta dpm/100cm²	Alpha dpm/100cm²
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13	N	A
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		

Bkgd Readings: α 2.4 β⁻ 78

Legend:

00 = mRem/h gamma | 00 C = mRem/h gamma contact | ① = Smear Location | ▽ = Air Sample Location | -X-X-X- = Rope, Boundary, or Barrier

00 β = mRem/h beta | 00 βC = mRem/h beta contact | --①-- = Large Area Wipe | = Bulk Material Sample

Section 2: Instrument Used

Instrument Model/SN:	Cal Due Date:	Probe Model/SN:	Cal Due Date:	Detector Eff.: (cpm/dpm)	MDA:	Other
2360/156371	8-15-02	43-89/164532	8-5-02	α.153 β.088	α65 β497	
N		N		N		N
A		A			A	A

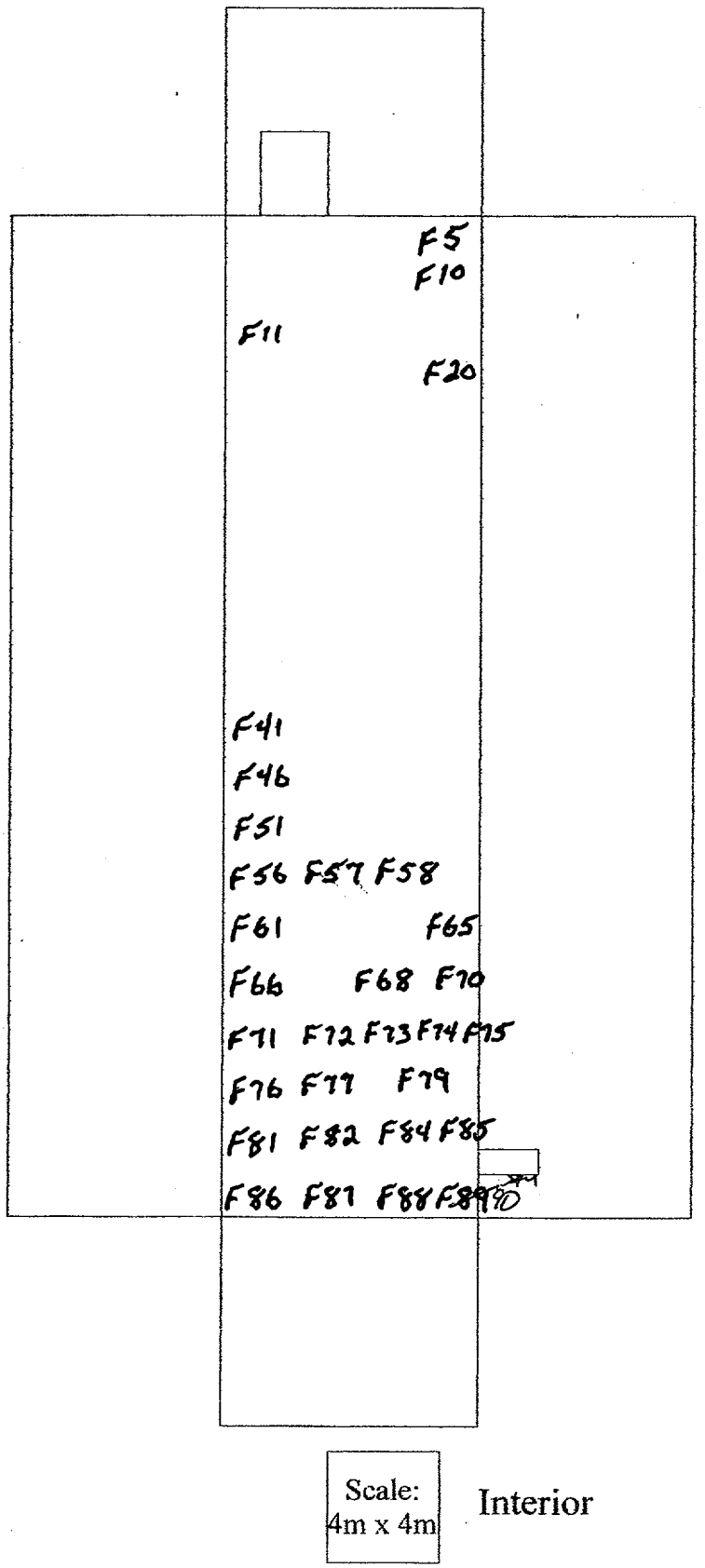
Section 3: Review and Approval

Survey Performed By (Sign):	Area Posted and/or Barricaded:	Date and Time:
[signature]	☐ Yes ☐ No ☒ Not Required	4-10-02 0900
Radiation Safety Officer (Print Name & Sign): Mike McDonald [signature]		Date and Time: 4-16-02 9:48

Building 32

North

02-0167



02-0107

Radiological Survey Results - Survey Location Indicator

Survey Area Information: Bldg 32 Floor

	Instrument Model/SN	Cal Due	Probe Model/SN	Cal Due	α Scan MDA	β Scan MDA	α Static MDA	β Static MDA
Instrument Data	2360/156378	8-15-02	43-89 164832	8-5-02			65	497

BKG78 α 2.4

	Print Name	Signature	Date
Performed By:	Steve Filo	Steve Filo	4-10-02
	DENNIS Whitlock	[illegible]	4-10-02

Location	β Scan (cpm)	α Scan (cpm)	β Static (unsh) (cpm)	β Static (sh) (cpm)	α Static (cpm)	ER (μrem/hr)	Smears (dpm/100 cm²) α	Smears (dpm/100 cm²) β
F 5			399	292	2	12		
F 10			329	282	9	12		
F 10			326	293	5	12		
F 20			334	253	4	12		
F 11			427	340	16	12		
F 41			398	290	11	15		
F 46			377	304	2	15		
F 51			384	308	5	15		
F 56			700	630	3	15		
F 61			1204	1123	3	14		
F 66			983	872	2	20		
F 71			377	297	8	20		
F 76			362	276	11	20		
F 81			365	300	5	20		
F 86			328	272	7	20		
F 57			396	340	4	22		
F 58			379	303	2	20		
F 65			376	305	5	15		
F 68			336	312	3	22		
F 70			342	284	3	15		
F 72			373	297	14	22		
F 73			365	359	9	22		
F 73			347	302	2	22		
F 74			314	300	8	24		
F 75			373	304	5	24		
F 77			357	290	1	24		
F 77			359	331	6	20		

2360 EFF: β .088
α .153

Model 19 # 22526
8-6-02

Radiological Survey Results - Survey Location Indicator

02-0107

Survey Area Information: Bldg 32 Floor

Instrument Data	Instrument Model/SN	Cal Due	Probe Model/SN	Cal Due	α Scan MDA	β Scan MDA	α Static MDA	β Static MDA

Performed By:	Print Name	Signature	Date

Location	β Scan (cpm)	α Scan (cpm)	β Static (unsh) (cpm)	β Static (sh) (cpm)	α Static (cpm)	ER (μrem/hr)	Smears (dpm/100 cm²) α	Smears (dpm/100 cm²) β
F 79			385	308	7	16		
F 82			419	340	3	24		
F 84			435	348	5	24		
F 85			440	347	7	16		
F 87			394	310	5	16		
F 88			386	301	4	14		
F ~~89~~ 90			416	318	6	16		

DDO-138 Radiation Protection Survey Report

Site: Molycorp / Washington, PA

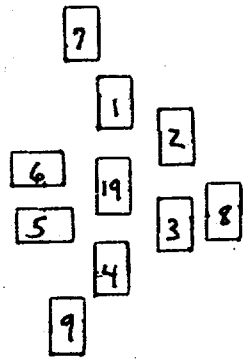
Section 1: Survey Information

Date:	Time:	Location:	Survey Issue Log Number:
4-15-02	1000	o/s Building # 32	02-~~0054~~ MB 0112

RWP Number:	Purpose of Survey:	Page
N/A	☐ RWP ☐ Routine Survey ☐ Unconditional Release ☐ Other:	1 of 2

Survey Title: One square meter Survey ~~Grid~~ MB # 19

see page 3 of 4 Survey # 02-0054



$565\left(\frac{100}{10,000}\right) + 228\left(1 - \frac{100}{10,000}\right)$

5.65 + 226 = 231 Ave

Smear Number	Beta dpm/100cm²	Alpha dpm/100cm²
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14	N	
15		A
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		

Bkgd Readings:

Legend:

00 = mRem/h gamma | 00 C = mRem/h gamma contact | ① = Smear Location | ▽ = Air Sample Location | -X-X-X- = Rope, Boundary, or Barrier

00 β = mRem/h beta | 00 βC = mRem/h beta contact | —Ⓓ— = Large Area Wipe | = Bulk Material Sample

Section 2: Instrument Used

Instrument Model/SN:	Cal Due Date:	Probe Model/SN:	Cal Due Date:	Detector Eff.: (cpm/dpm)	MDA: β⁻	MDA: α	Other β BKG	Other α
2224-1/129463	8-6-02	43-89/109230	8-6-02	α=.154/β=.092	172	76	8	3.7

Section 3: Review and Approval

Survey Performed By (Sign):	Area Posted and/or Barricaded:	Date and Time:
Mark Blauciak	☐ Yes ☐ No ☑ Not Required	4-15-02 / 0935

Radiation Safety Officer (Print Name & Sign):	Date and Time:
Mike McDonald	4-16-02 9:48

Radiological Survey Results - Calculational Sheet

Survey #02-0112

Location	β Static (unsh) (cpm)	β Static (sh) (cpm)	Gross β	Minus Bkgd = (Net β)	Net β dpm/100 cm²
W-1	408	394	14	6	65
W-2	445	409	36	28	304
W-3	528	504	24	16	174
W-4	429	392	31	29	315
W-5	364	326	38	30	326
W-6	404	365	39	31	337
W-7	410	398	12	4	43
W-8	418	395	23	15	163
W-9	368	330	38	30	326
					228 Ave
W19	344	284	60	52	565

Instrument Model/SN:	Probe Model/SN:	Detector Eff.: (cpm/dpm)

Material	Bkgd

BKG β^- = 8 wall
α = 3.7

Appendix H

Background Assessment Data

Molycorp Washington, PA

Background Assessment

Material-specific background levels were established by RSI in late 2001 for each type of instrument used for total surface contamination measurements during their final status surveys of buildings 39 and 42. Similar instrumentation was selected for use by MACTEC to take advantage of this previously available information.

Background measurements were collected by RSI on surfaces of similar construction as the buildings at the site and having no possibility of being impacted by site operations. Measurements to establish background for a specific material were collected from multiple locations to provide an estimate of the variability or uncertainty. Background determination was performed using the same instrumentation that was used for final status survey data collection. An average background value was determined for each material surveyed. Background determinations were required and performed for concrete and a class of material designated a generic material.

The number of background measurements obtained per material type:

- Concrete - minimum of 20 measurements
- Cinderblock - minimum of 20 measurements
- Generic Material - minimum of 10 measurements for each type of material surveyed (i.e., wood, insulation, corrugated steel, etc.)

MACTEC performed material-specific backgrounds for poured concrete with it's four large-area scintillator instruments. Results of the backgrounds matched those of RSI, and gave confidence that other material-specific background information established by RSI was valid for use. The most conservative backgrounds values were selected and used for all background subtracts for direct (static) type surveys performed.

Background measurements for poured concrete were calculated from surveys obtained at the Canton Volunteer Fire Department Station 52-1, Canton Township, PA on their poured concrete surfaces. A mean value for each instrument was calculated. The most conservative background value was selected and used by the Health Physics technicians for all instrument background subtractions.

Included in this appendix are the results of MACTEC's background assessment data.

Concrete Background Assessment
Molycorp Washington, PA

Poured Concrete Surfaces

Ludlum Model 2360 (145465) with 43-89 (145391)

Beta - Direct Measurements (cpm)

Unshield	Shield	Net
348	272	76
321	260	61
345	282	63
418	271	147
377	269	108
361	273	88
318	266	52
359	302	57
405	281	124
354	263	91
310	231	79
390	299	91
308	256	52
360	261	99
340	253	87
359	292	67
356	266	90
352	280	72
336	282	54
390	275	115

Mean (cpm)	84
Stand Deviation	25.8
n_b	7

Readings taken at the Canton Volunteer Fire Department Station 52-1, Canton Township, PA on their poured concrete surfaces.

Concrete Background Assessment
Molycorp Washington, PA

Poured Concrete Surfaces

Ludlum Model 2360 (164680) with 43-89 (118544)

Beta - Direct Measurements (cpm)

Unshield	Shield	Net
308	255	53
309	264	45
349	239	110
356	254	102
360	281	79
370	245	125
343	242	101
354	243	111
354	256	98
345	252	93
329	254	75
345	232	113
363	232	131
330	241	89
319	236	83
310	230	80
343	262	81
338	255	83
322	260	62
358	263	95

Mean (cpm)	90
Stand Deviation	22.3
n_b	5

Readings taken at the Canton Volunteer Fire Department Station 52-1, Canton Township, PA on their poured concrete surfaces.

Concrete Background Assessment
Molycorp Washington, PA

Poured Concrete Surfaces

Ludlum Model 2360 (156371) with 43-89 (164832)

Beta - Direct Measurements (cpm)

Unshield	Shield	Net
349	273	76
329	268	61
368	248	120
326	293	33
338	289	49
289	257	32
324	254	70
345	310	35
353	281	72
369	261	108
418	269	149
364	280	84
377	266	111
317	249	68
350	294	56
366	273	93
343	251	92
368	260	108
362	294	68
356	267	89

Mean (cpm)	79
Stand Deviation	30.9
n_b	11

Readings taken at the Canton Volunteer Fire Department Station 52-1, Canton Township, PA on their poured concrete surfaces.

Concrete Background Assessment
Molycorp Washington, PA

Poured Concrete Surfaces

Ludlum Model 2224-1 (129463) with 43-89 (169230)

Beta - Direct Measurements (cpm)

Unshield	Shield	Net
360	301	59
318	267	51
379	287	92
344	269	75
342	290	52
396	266	130
336	273	63
328	272	56
358	314	44
351	256	95
347	272	75
405	276	129
350	284	66
388	299	89
354	292	62
349	257	92
395	277	118
359	302	57
326	287	39
393	270	123

Mean (cpm)	78
Stand Deviation	28.8
n_b	10

Readings taken at the Canton Volunteer Fire Department Station 52-1, Canton Township, PA on their poured concrete surfaces.

Appendix I

Instrumentation Data

Molycorp Washington, PA

Instrumentation Data

This data package contains instrumentation information (background, QC, and source response data forms) for the instruments used during the final status survey of Buildings 25, 29, 32, 33, 35, 36 and the Soil Sample Storage Room.

Daily Instrumentation Operational Check Sheet

EFF .092

Instrument: 2224-1 # 129463 Probe: 43-89 # 169230

Cal Due: 8-6-02 Cal Due: 8-6-02

Source ID: Tc99 3935 Mean Source Count Rate: 1862 Mean +2 σ Value: 1958 Mean -2 σ Value: 1766

Radiation Type: β- Sigma Value: 48 Mean +3 σ Value: 2006 Mean -3 σ Value: 1718

Background					Source Check				Results	
Date	Time	Count Time (min)	Gross Counts	BKGD CPM	Count Time (min)	Gross Counts	W/I 2 σ Value	W/I 3 σ Value	LLD	SAT/ UNSAT
4-11-02	0617	5	1346	269	1	1873	✓	✓	62	SAT
4-11-02	1612	—	—	—	1	1856	✓	✓	—	SAT
4-15-02	0605	5	1424	285	1	1912	✓	✓	64	SAT
4-15-02	1705	—	—	—	1	1799	✓	✓	—	SAT
4-16-02	0606	5	1410	282	1	1957	✓	✓	64	SAT
4-16-02	1720	—	—	—	1	1781	✓	✓	—	SAT

Daily Instrumentation Operational Check Sheet

EFF .154

Instrument: 2224-1 #129463 Probe: 43-89 #169230

Cal Due: 8-6-02 Cal Due: 8-6-02

Source ID: Th230 3939 Mean Source Count Rate: 705 Mean +2 σ Value: 751 Mean -2 σ Value: 659

Radiation Type: α Sigma Value: 23 Mean +3 σ Value: 774 Mean -3 σ Value: 636

Background					Source Check				Results	
Date	Time	Count Time (min)	Gross Counts	BKGD CPM	Count Time (min)	Gross Counts	W/I 2 σ Value	W/I 3 σ Value	LLD	SAT/ UNSAT
4-11-02	0617	5	9	1.8	1	670	✓	✓	8	SAT
4-11-02	1610	—	—	—	1	684	✓	✓	—	SAT
4-15-02	0605	5	14	2.8	1	701	✓	✓	9	SAT
4-15-02	1706	—	—	—	1	709	✓	✓	—	SAT
4-16-02	0606	5	8	1.6	1	672	✓	✓	8	SAT
4-16-02	1718	—	—	—	1	670	✓	✓	—	SAT

EFF. 092

Daily Instrumentation Operational Check Sheet

Instrument: 2224-1 #129463 Probe: 43-89 #169230

Cal Due: 8-6-02 Cal Due: 8-6-02

Source ID:	Tc 99 3935	Mean Source Count Rate:	1862	Mean +2 σ Value:	1958	Mean -2 σ Value:	1766
Radiation Type:	β-	Sigma Value:	48	Mean +3 σ Value:	2006	Mean -3 σ Value:	1718

Background					Source Check				Results	
Date	Time	Count Time (min)	Gross Counts	BKGD CPM	Count Time (min)	Gross Counts	W/I 2 σ Value	W/I 3 σ Value	LLD	SAT/ UNSAT
3-26-02	1700	—	—	—	1	1869	✓	✓	—	SAT
3-27-02	0610	5	1334	267	1	1877	✓	✓	62	SAT
3-28-02	0610	5	1356	271	1	1909	✓	✓	62	SAT
4-1-02	0645	5	1328	266	1	1816	✓	✓	62	SAT
4-2-02	0624	5	1420	284	1	1877	✓	✓	84	SAT
4-2-02	1600	—	—	—	1	1803	—	—	—	SAT
4-3-02	0609	5	1330	266	1	1840	✓	✓	62	SAT
4-4-02	0624	5	1308	262	1	1776	✓	✓	61	SAT
4-4-02	1650	—	—	—	1	1827	✓	✓	—	SAT
4-8-02	0614	5	1268	254	1	1926	✓	✓	58	SAT
4-8-02	1715	—	—	—	1	1816	✓	✓	—	SAT
4-9-02	0609	5	1333	267	1	1918	✓	✓	62	SAT
4-9-02	1621	—	—	—	1	1905	✓	✓	—	—
4-10-02	0612	5	1271	254	1	1879	✓	✓	58	SAT
4-10-02	1655	—	—	—	1	1858	✓	✓	—	SAT
4-11-02	0611	5			1					

Daily Instrumentation Operational Check Sheet

EFF .154

Instrument: 2224-1 # 129463 Probe: 43-89 # 169230

Cal Due: 8-6-02 Cal Due: 8-6-02

Source ID:	Th230 3937	Mean Source Count Rate:	705	Mean +2 σ Value:	751	Mean -2 σ Value:	659
Radiation Type:	α	Sigma Value:	23	Mean +3 σ Value:	774	Mean -3 σ Value:	636

Background					Source Check				Results	
Date	Time	Count Time (min)	Gross Counts	BKGD CPM	Count Time (min)	Gross Counts	W/I 2 σ Value	W/I 3 σ Value	LLD	SAT/ UNSAT
3-26-02	1700	—	—	—	1	747	✓	✓	—	Sat
3-27-02	0610	5	20	4	1	692	✓	✓	10	SAT
3-28-02	0610	5	9	1.8	1	674	✓	✓	8	SAT
~~4-28-02~~			no							
4-1-02	0630	5	8	1.6	1	689	✓	✓	8	Sat
4-2-02	0624	5	18	3.6	1	668	—	—	10	SAT
4-2-02	1600	—	—	—	1	688	—	—	—	SAT
4-3-02	0609	5	4	.8	1	679	✓	✓	6	SAT
4-4-02	0624	5	12	2.4	1	687	✓	✓	9	SAT
4-4-02	1655	—	—	—	1	730	✓	✓	✓	Sat
4-8-02	0614	5	3	.6	1	733	✓	✓	6	SAT
4-8-02	1715	—	—	—	1	691	✓	✓	—	SAT
4-9-02	0609	5	4	.8	1	696	✓	✓	6	SAT
4-9-02	1620	—	—	—	1	671	✓	✓	—	SAT
4-10-02	0612	5	5	1	1	676	✓	✓	7	SAT
4-10-02	1650	—	—	—	1	741	—	—	—	Sat

EFF .092

Daily Instrumentation Operational Check Sheet

Instrument: 2224-1 #129463 Probe: 43-89 #169230

Cal Due: 8-6-02 Cal Due: 8-6-02

Source ID:	Tc 99 3935	Mean Source Count Rate:	1862	Mean +2 σ Value:	1958	Mean -2 σ Value:	1766
Radiation Type:	β-	Sigma Value:	48	Mean +3 σ Value:	2006	Mean -3 σ Value:	1718

Background					Source Check				Results	
Date	Time	Count Time (min)	Gross Counts	BKGD CPM	Count Time (min)	Gross Counts	W/I 2 σ Value	W/I 3 σ Value	LLD	SAT/ UNSAT
3-7-02	1710	—	—	—	1	1884	—	—	—	SAT
3-8-02	0622	5	1356	271	1	1881	✓	✓	87	SAT
3-11-02	0634	5	1387	277	1	1903	✓	✓	87	SAT
3-11-02	1710	—	—	—	1	1945	—	—	—	Sat
3-12-02	0618	5	1350	270	1	1910	✓	✓	87	SAT
3-12-02	1700	—	—	—	1	1905	—	—	—	Sat
3-13-02	0624	5	1328	266	1	1869	✓	✓	86	SAT
3-14-02	0624	5	1365	273	1	1926	✓	✓	87	SAT
3-18-02	0622	5	1329	266	1	1915	✓	✓	86	SAT
3-19-02	0614	5	1307	261	1	1853	✓	✓	85	SAT
3-19-02	1640	—	—	—	1	1843	—	—	—	Sat.
3-20-02	0616	5	2224	445	1	1811	✓	✓	110	SAT
3-21-02	0622	5	1346	269	1	1887	✓	✓	87	SAT
3-21-02	1630	—	—	—	1	1878	✓	✓	—	Sat.
3-25-02	0609	5	1329	266	1	1900	✓	✓	48	SAT
3-26-02	0622	5	1290	258	1	1920	✓	✓	61	SAT

EFF .154

Daily Instrumentation Operational Check Sheet

Instrument: 2224-1 # 129463 Probe: 43-89 # 169230

Cal Due: 8-6-02 Cal Due: 8-6-02

Source ID:	Th230 3937	Mean Source Count Rate:	705	Mean +2 σ Value:	751	Mean -2 σ Value:	659
Radiation Type:	α	Sigma Value:	23	Mean +3 σ Value:	774	Mean -3 σ Value:	636

Background					Source Check				Results	
Date	Time	Count Time (min)	Gross Counts	BKGD CPM	Count Time (min)	Gross Counts	W/I 2 σ Value	W/I 3 σ Value	LLD	SAT/ UNSAT
3-7-02	1708	—	—	—	1	687	—	—	—	Sat
3-8-02	0622	5	2	.4	1	694	✓	✓	6	SAT
3-11-02	0624	5	12	2.4	1	680	✓	✓	11	SAT
3-11-02	1710	—	—	—	1	695	—	—	—	Sat
3-12-02	0618	5	4	.8	1	676	✓	✓	7	SAT
3-12-02	1700	—	—	—	1	688	—	—	—	Sat
3-13-02	0624	5	4	.8	1	695	✓	✓	7	SAT
3-14-02	0624	5	8	1.6	1	703	✓	✓	9	SAT
3-18-02	0622	5	8	1.6	1	675	✓	✓	9	SAT
3-19-02	0614	5	4	.8	1	734	✓	✓	7	SAT
3-19-02	1640	—	—	—	1	709	—	—	—	Sat
3-20-02	0616	5	14	2.8	1	694	✓	✓	11	SAT
3-21-02	0622	5	12	2.4	1	662	✓	✓	11	SAT
3-21-02	1630	—	—	—	1	666	✓	✓	—	Sat.
3-25-02	0609	5	14	2.8	1	695	✓	✓	5.1	SAT
3-26-02	0622	5	8	1.6	1	680	✓	✓	7.5	SAT

Daily Instrumentation Operational Check Sheet

EFF .098

Instrument: 2360 # 145469 Probe: 43-89 # 145391

Cal Due: 7-10-02 Cal Due: 7-14-02

Source ID: Tc 99 3935 Mean Source Count Rate: 2117 Mean +2 σ Value: 2195 Mean -2 σ Value: 2039

Radiation Type: β- Sigma Value: 39 Mean +3 σ Value: 2234 Mean -3 σ Value: 2000

Background					Source Check				Results	
Date	Time	Count Time (min)	Gross Counts	BKGD CPM	Count Time (min)	Gross Counts	W/I 2 σ Value	W/I 3 σ Value	LLD	SAT/ UNSAT
4-11-02	0619	5	1215	243	1	2186	✓	✓	59	SAT
4-25-02	0607	5	1262	252	1	2159	✓	✓	60	SAT
4-15-02	1708	—	—	—	1	2160	✓	✓	—	SAT
4-16-02	0608	5	1245	249	1	2190	✓	✓	60	SAT

Daily Instrumentation Operational Check Sheet

Instrument: 2360 # 145469 Probe: 43-89 # 145391

Cal Due: 7-10-02 Cal Due: 7-14-02

Source ID:	Th230 3937	Mean Source Count Rate:	674	Mean +2 σ Value:	734	Mean -2 σ Value:	614
Radiation Type:	α	Sigma Value:	30	Mean +3 σ Value:	764	Mean -3 σ Value:	584

Background					Source Check				Results	
Date	Time	Count Time (min)	Gross Counts	BKGD CPM	Count Time (min)	Gross Counts	W/I 2 σ Value	W/I 3 σ Value	LLD	SAT/ UNSAT
4-11-02	0619	5	8	1.6	1	617	✓	✓	8	SAT
4-15-02	0607	5	8	1.6	1	658	✓	✓	8	SAT
4-15-02	1710	—	—	—	1	700	✓	✓	—	SAT
4-16-02	0608	5	9	1.8	1	642	✓	✓	8	SAT

EFF. .098

Daily Instrumentation Operational Check Sheet

Instrument: 2360 # 145469 Probe: 43-89 # 145391

Cal Due: 7-10-02 Cal Due: 7-14-02

Source ID:	Tc99 3935	Mean Source Count Rate:	2117	Mean +2 σ Value:	2195	Mean -2 σ Value:	2039
Radiation Type:	β-	Sigma Value:	39	Mean +3 σ Value:	2234	Mean -3 σ Value:	2000

Background					Source Check				Results	
Date	Time	Count Time (min)	Gross Counts	BKGD CPM	Count Time (min)	Gross Counts	W/I 2 σ Value	W/I 3 σ Value	LLD	SAT/ UNSAT
3-19-02	0616	5	1267	253	1	2110	✓	✓	84	SAT
3-19-02	1635	—	—	—	1	2147	—	—	—	Sat
3-20-02	0618	5	1264	253	1	2078	✓	✓	84	SAT
3-21-02	0624	5	1136	227	1	2056	✓	✓	79	SAT
3-21-02	1635	—	—	—	1	2174	✓	✓	—	Sat.
3-25-02	0611	5	1236	247	1	2061	✓	✓	45	SAT
3-26-02	0624	5	1149	230	1	2128	✓	✓	58	SAT
3-27-02	0612	5	1218	244	1	2126	✓	✓	59	SAT
3-28-02	0612	5	1153	231	1	2102	✓	✓	58	SAT
4-1-02	0700	5	1209	242	1	2065	✓	✓	59	Sat
4-2-02	0624	5	1174	235	1	2052	✓	✓	58	SAT
4-3-02	0611	5	1235	247	1	2122	✓	✓	60	SAT
4-4-02	0626	5	1194	239	1	2159	✓	✓	59	SAT
4-8-02	0616	5	1196	239	1	2130	✓	✓	59	SAT
4-9-02	0611	5	1182	236	1	2104	✓	✓	58	SAT
4-10-02	0614	5	1201	240	1	2125	✓	✓	59	SAT

EFF .155

Daily Instrumentation Operational Check Sheet

Instrument: 2360 # 145469 Probe: 43-89 # 145391

Cal Due: 7-10-02 Cal Due: 7-14-02

Source ID:	Th230 3937	Mean Source Count Rate:	674	Mean +2 σ Value:	734	Mean -2 σ Value:	614
Radiation Type:	α	Sigma Value:	30	Mean +3 σ Value:	764	Mean -3 σ Value:	584

Background					Source Check				Results	
Date	Time	Count Time (min)	Gross Counts	BKGD CPM	Count Time (min)	Gross Counts	W/I 2 σ Value	W/I 3 σ Value	LLD	SAT/ UNSAT
3-19-02	0616	5	14	2.8	1	671	✓	✓	11	SAT
3-19-02	1635	—	—	—	1	708	—	—	—	~~SAT~~
3-20-02	0618	5	11	2.2	1	642	✓	✓	10	SAT
3-21-02	0624	5	6	1.2	1	656	✓	✓	8	SAT
3-21-02	1635	—	—	—	1	646	✓	✓	—	~~SAT~~
3-25-02	0611	5	18	3.6	1	679	✓	✓	6	SAT
3-26-02	0624	5	19	3.8	1	671	✓	✓	10	SAT
3-27-02	0612	5	12	2.4	1	626	✓	✓	9	SAT
3-28-02	0612	5	13	2.6	1	722	✓	✓	9	SAT
4-1-02	0630	~~MDA 5~~	14	2.8	1	651	✓	✓	9	SAT
4-2-02	0624	5	11	2.2	1	653	✓	✓	8	SAT
4-3-02	0611	5	8	1.6	1	720	✓	✓	8	SAT
4-4-02	0626	5	8	1.6	1	654	✓	✓	8	SAT
4-8-02	0616	5	7	1.4	1	655	✓	✓	7	SAT
4-9-02	0611	5	2	.4	1	662	✓	✓	5	SAT
4-10-02	0614	5	8	1.6	1	652	✓	✓	8	SAT

DETERMINATION OF SOURCE QC LIMITS

Instrument: 2360 ID: 145469 Date: 3-18-02

Detector: 43-89 ID: 145391 Operating Voltage: 675

20 Source-Count: Alpha			
Source ID: Th 230 3937			
Count	Gross Cts (x_i)	$(x_i)-(\bar{x})$	$[(x_i)-(\bar{x})]^2$
1	639	-35	1225
2	680	6	36
3	686	12	144
4	695	21	441
5	705	31	961
6	639	-35	1225
7	671	-3	9
8	671	-3	9
9	722	48	2304
10	695	21	441
11	680	6	36
12	692	18	324
13	705	31	961
14	677	3	9
15	625	-49	2401
16	673	-1	1
17	616	-58	3364
18	711	37	1369
19	643	-31	961
20	645	-29	841

$\bar{x}$ =	674	σ =	30
2σ =	60	3σ =	90

20 Source-Count: Beta			
Source ID: Tc 99 3935			
Count	Gross Cts (x_i)	$(x_i)-(\bar{x})$	$[(x_i)-(\bar{x})]^2$
1	2145	28	784
2	2115	-2	4
3	2089	-28	784
4	2135	18	324
5	2223	106	11236
6	2059	-58	3364
7	2118	1	1
8	2087	-30	900
9	2138	21	441
10	2131	14	196
11	2076	-41	1681
12	2097	-20	400
13	2137	20	400
14	2084	-33	1089
15	2139	22	484
16	2153	36	1296
17	2054	-63	3969
18	2143	26	676
19	2116	-1	1
20	2098	-19	361

$\bar{x}$ =	2117	σ =	39
2σ =	78	3σ =	117

Mean	Sigma
$\bar{x} = \frac{\sum x_i}{20}$	$\sigma = \sqrt{\frac{\Sigma(x_i - \bar{x})^2}{(n-1)}}$

Where:
σ = standard deviation
$\bar{x}$ = mean count
x_i = each individual measurement
n = number of measurements

Chi-squared

$$X^2 = \frac{\sum(n-\bar{n})^2}{\bar{n}}$$

Where:
n = data for individual counts
$\bar{n}$ = average of the twenty data points

Alpha Values	
mean +2 σ = 734	mean -2 σ = 614
mean +3 σ = 764	mean -3 σ = 584
X^2 = 25.3	

Beta Values	
mean +3 σ = 2234	mean -2 σ = 2039
mean +2 σ = 2195	mean -3 σ = 2000
X^2 = 13.4	

Reviewed: [signature] Date: 4-16-02

,088

Daily Instrumentation Operational Check Sheet

Instrument: 2360 # 156321 Probe: 43-89 # 164832

Cal Due: 8-15-02 Cal Due: 8-5-02

Source ID: Tc 993935 Mean Source Count Rate: 2101 Mean +2 σ Value: 2171 Mean -2 σ Value: 2031

Radiation Type: B- Sigma Value: 35 Mean +3 σ Value: 2206 Mean -3 σ Value: 1996

Background					Source Check				Results	
Date	Time	Count Time (min)	Gross Counts	BKGD CPM	Count Time (min)	Gross Counts	W/I 2 σ Value	W/I 3 σ Value	LLD	SAT/ UNSAT
3-28-02	1700	—	—	—	1	2041	—	—	—	S
4-1-02	0655	5	1411	282	1	2102	—	—	~~126~~ 63	Sat
4-1-02	1700	—	—	—	1	2043	—	—	—	Sat
4-2-02	0620	5	1401	280	1	2106	✓	✓	~~126~~ 63	SAT
4-2-02	1530	—	—	—	1	2112	—	—	—	SAT
4-3-02	0605	5	1448	290	1	2103	✓	✓	64	SAT
4-4-02	0620	5	151 ~~1476~~	302	1	2134	✓	✓	66	SAT
4-8-02	0610	5	1372	274	1	2054	✓	✓	60	SAT
4-8-02	1715	—	—	—	1	2141	✓	✓	—	SAT
4-9-02	0605	5	1476	295	1	2093	✓	✓	62	SAT
4-9-02	1024	—	—	—	1	2073	✓	✓	—	SAT
4-10-02	0608	5	1479	296	1	2078	✓	✓	62	SAT
4-10-02	1715	—	—	—	1	2086	✓	✓	—	SAT
4-11-02	0615	5	1400	280	1	2052	✓	✓	63	SAT
4-16-02	0604	5	1479	296	1	2041	✓	✓	62	SAT

Daily Instrumentation Operational Check Sheet

EFF .153

Instrument: 23360 # 156371 Probe: 43-89 # 164832

Cal Due: 8-15-02 Cal Due: 8-5-02

Source ID:	TH 230 3937	Mean Source Count Rate:	695	Mean +2 σ Value:	753	Mean -2 σ Value:	637
Radiation Type:	α	Sigma Value:	29	Mean +3 σ Value:	782	Mean -3 σ Value:	608

Background					Source Check				Results	
Date	Time	Count Time (min)	Gross Counts	BKGD CPM	Count Time (min)	Gross Counts	W/I 2 σ Value	W/I 3 σ Value	LLD	SAT/ UNSAT
3-28-02	1700	—	—	—	1	679	—	—	—	Sat
4-1-02	0635	5	6	1.2	1	702	—	—	~~4.4~~ 7	Sat
4-1-02	1705	—	—	—	1	687	—	—	—	Sat
4-2-02	0620	5	10	2	1	~~2σ +65σ~~	✓	✓	~~4.6~~ 7	~~Sat~~
						~~65σ~~				
4-2-02	1530	—	—	—	1	672	—	—	—	Sat
4-3-02	0605	5	4	.8	1	684	✓	✓	6	~~Sat~~
4-4-02	0620	5	4	.8	1	704	✓	✓	6	~~Sat~~
4-8-02	0610	5	9	1.8	1	704	✓	✓	8	~~Sat~~
4-8-02	1710	—	—	—	1	737	—	—	—	Sat
4-9-02	0605	5	6	1.2	1	677	✓	✓	7	~~Sat~~
4-9-02	1627	—	—	—	1	653	✓	✓	—	SAT
4-10-02	0608	5	8	1.6	1	723	✓	✓	8	~~Sat~~
4-10-02	1717	—	—	—	1	680	✓	✓	—	SAT
4-11-02	0615	5	7	1.4	1	648	✓	✓	7	~~Sat~~
4-16-02	0604	5	16	3.2	1	675	✓	✓	9	~~Sat~~

EFF. 084

Daily Instrumentation Operational Check Sheet

Instrument: 2360 #156371 Probe: 43-89 #164832

Cal Due: 8-15-02 Cal Due: 8-5-02

Source ID:	Tc 99 3935	Mean Source Count Rate:	2101	Mean +2 σ Value:	2171	Mean -2 σ Value:	2031
Radiation Type:	B⁻	Sigma Value:	35	Mean +3 σ Value:	2206	Mean -3 σ Value:	1996

Background					Source Check				Results	
Date	Time	Count Time (min)	Gross Counts	BKGD CPM	Count Time (min)	Gross Counts	W/I 2 σ Value	W/I 3 σ Value	LLD	SAT/ UNSAT
3-12-02	1700	—	—	—	1	2038	—	—	—	S
3-13-02	0620	5	1486	297	1	2051	✓	✓	91	SAT
3-13-02	1700	—	—	—	1	2073	✓	✓	—	Sat
3-14-02	0620	5	1451	290	1	2088	✓	✓	89	SAT
3-15-02	0618	5	1458	292	1	2165	✓	✓	90	SAT
3-19-02	0610	5	1387	277	1	2081	✓	✓	87	SAT
3-19-02	1715	—	—	—	1	2043	—	—	—	SAT
3-20-02	0612	5	1436	287	1	2134	✓	✓	89	SAT
3-20-02	1645	—	—	—	1	2025	—	—	—	PAT
3-21-02	0618	5	1484	297	1	2134	✓	✓	91	SAT
3-25-02	0605	5	1510	302	1	2170	✓	✓	49	SAT
3-26-02	0618	5	1440	288	1	2048	✓	✓	64	SAT
3-26-02	1645	—	—	—	1	2039	✓	✓	—	Sat
3-27-02	0606	5	1520	304	1	2109	✓	✓	66	SAT
3-27-02	1700	—	—	—	1	2036	—	—	—	SAT
3-28-02	0606	5	1512	302	1	2177	✓	✓	66	SAT

EFF. 153

Daily Instrumentation Operational Check Sheet

Instrument: 2360 #156371 Probe: 43-89 #164832

Cal Due: 8-15-02 Cal Due: 8-5-02

Source ID:	TH 230 3937	Mean Source Count Rate:	695	Mean +2 σ Value:	753	Mean -2 σ Value:	637
Radiation Type:	α	Sigma Value:	29	Mean +3 σ Value:	782	Mean -3 σ Value:	608

Background					Source Check				Results	
Date	Time	Count Time (min)	Gross Counts	BKGD CPM	Count Time (min)	Gross Counts	W/I 2 σ Value	W/I 3 σ Value	LLD	SAT/ UNSAT
3-12-02	1700	—	—	—	1	682	✓	✓	—	SAT
3-13-02	0620	5	5	1	1	698	✓	✓	8	SAT
3-13-02	1720	—	—	—	1	735	✓	✓	✓	Sat
3-14-02	0620	5	1	.2	1	730	✓	✓	5	SAT
3-18-02	0618	5	7	1.4	1	669	✓	✓	9	SAT
3-19-02	0610	5	8	1.6	1	694	✓	✓	9	SAT
3-19-02	D/S	—		—	1	702	—	—	—	SAT
3-20-02	0612	5	21	4.2	1	721	✓	✓	13	SAT
3-20-02	1650	—	—	✓	1	741	—	—	—	SAT
3-21-02	0618	5	23	4.6	1	688	✓	✓	14	SAT
3-25-02	0605	5	8	1.6	1	730	✓	✓	4	SAT
3-26-02	0618	5	4	.8	1	721	✓	✓	6.2	SAT
3-26-02	1545	—	—	—	1	734	✓	✓	✓	Sat
3-27-02	0606	5	14	2.8	1	648	✓	✓	9	SAT
3-27-02	1700	—	—	—	1	669	—	—	—	SAT
3-28-02	0606	5	4	.8	1	653	✓	✓	6	SAT

EFF. 164

Daily Instrumentation Operational Check Sheet

Instrument: 2360 # 164680 Probe: 43-89 # 118544

Cal Due: 7-9-02 Cal Due: 8-6-02

Source ID:	Th230 3937	Mean Source Count Rate:	731	Mean +2 σ Value:	789	Mean -2 σ Value:	673
Radiation Type:	α	Sigma Value:	29	Mean +3 σ Value:	818	Mean -3 σ Value:	644

Background					Source Check				Results	
Date	Time	Count Time (min)	Gross Counts	BKGD CPM	Count Time (min)	Gross Counts	W/I 2 σ Value	W/I 3 σ Value	LLD	SAT/ UNSAT
3-7-02	0612	5	11	2.2	1	721	✓	✓	10	SAT
3-7-02	1718	—	—	—	1	693	—	—	—	SAT
3-8-02	0620	5	7	1.4	1	706	✓	✓	9	SAT
3-8-02	1425	—	—	—	1	760	—	—	—	SAT
3-11-02	0630	5	7	1.4	1	733	✓	✓	9	SAT
3-12-02	0620	5	9	1.8	1	725	✓	✓	10	SAT
3-12-02	1700	—	—	—	1	744	—	—	—	SAT
3-13-02	0622	5	16	3.2	1	774	✓	✓	12	SAT
3-14-02	0622	5	10	2	1	693	✓	✓	10	SAT
3-14-02	1700	—	—	—	1	710	—	—	—	SAT
3-18-02	0670	5	15	3	1	703	✓	✓	12	SAT
3-18-02	1710	—	—	—	1	708	—	—	—	SAT
3-19-02	0612	5	3	.6	1	732	✓	✓	7	SAT
3-19-02	1645	—	—	—	1	740	—	—	—	SAT
3-20-02	0614	5	9	1.8	1	681	✓	✓	10	SAT
3-20-02	1645	—	—	—	1	728	—	—	—	SAT

EFF. 113

Daily Instrumentation Operational Check Sheet

Instrument: 23-60 # 164680 Probe: 43-89 # 118544

Cal Due: 7-9-02 Cal Due: 8-6-02

Source ID:	Tc 99 3935	Mean Source Count Rate:	2447	Mean +2 σ Value:	2535	Mean -2 σ Value:	2359
Radiation Type:	β-	Sigma Value:	44	Mean +3 σ Value:	2579	Mean -3 σ Value:	2315

Background					Source Check				Results	
Date	Time	Count Time (min)	Gross Counts	BKGD CPM	Count Time (min)	Gross Counts	W/I 2 σ Value	W/I 3 σ Value	LLD	SAT/ UNSAT
3-2-02	0612	5	1337	267	1	2518	✓	✓	86	sat
3-7-02	1715	—	—	—	1	2489	—	—	—	sat
3-8-02	0620	5	1359	272	1	2504	✓	✓	87	sat
3-8-02	1425	—	—	—	1	2528	—	—	—	sat
3-11-02	0630	5	1379	276	1	2528	✓	✓	87	sat
3-12-02	0620	5	1354	271	1	2482	✓	✓	87	sat
3-12-02	1706	—	—	—	1	2452	—	—	—	sat
3-13-02	0622	5	1377	275	1	2499	✓	✓	87	sat
3-14-02	0622	5	1386	277	1	2464	✓	✓	87	sat
3-14-02	1700	—	—	—	1	2404	—	—	—	sat
3-18-02	0620	5	1583	317	1	2470	✓	✓	93	sat
3-18-02	1715	—	—	—	1	2496	—	—	—	sat
3-19-02	0612	5	1455	291	1	2471	✓	✓	90	sat
3-19-02	1645	—	—	—	1	2444	—	—	—	sat
3-20-02	0614	5	1510	302	1	2520	✓	✓	91	sat
3-20-02	1645	—	—	—	1	2476	—	—	—	sat

Daily Instrumentation Operational Check Sheet

EFF. 113

Instrument: 2360 #164680 Probe: 43-89 #118544

Cal Due: 7-9-02 Cal Due: 8-6-02

Source ID:	Tc 99 3935	Mean Source Count Rate:	2447	Mean +2 σ Value:	2535	Mean -2 σ Value:	2359
Radiation Type:	B-	Sigma Value:	44	Mean +3 σ Value:	2579	Mean -3 σ Value:	2315

Background					Source Check				Results	
Date	Time	Count Time (min)	Gross Counts	BKGD CPM	Count Time (min)	Gross Counts	W/I 2 σ Value	W/I 3 σ Value	LLD	SAT/ UNSAT
4-4-02	0622	5	1368	274	1	2520	✓	✓	63	SAT
4-4-02	1645	—	—	—	—	2426	✓	✓	✓	Sat
4-5-02	0612	5	1424	285	1	2504	✓	✓	64	SAT
4-9-02	0607	5	1411	282	1	2517	✓	✓	64	SAT
4-9-02	1610	—	—	—	1	2429	✓	✓	—	SAT
4-10-02	0610	5	1475	295	1	2517	✓	✓	65	SAT
4-10-02	1710	—	—	—	1	2506	✓	✓	✓	Sat
			1269							

Daily Instrumentation Operational Check Sheet

EFF. .164

Instrument: 2360 #164680 Probe: 43-89 #118544

Cal Due: 7-9-02 Cal Due:

Source ID:	TH 230 3937	Mean Source Count Rate:	231	Mean +2 σ Value:	289	Mean -2 σ Value:	673
Radiation Type:	α	Sigma Value:	29	Mean +3 σ Value:	818	Mean -3 σ Value:	644

Background					Source Check				Results	
Date	Time	Count Time (min)	Gross Counts	BKGD CPM	Count Time (min)	Gross Counts	W/I 2 σ Value	W/I 3 σ Value	LLD	SAT/ UNSAT
4-4-02	0622	5	18	3.6	1	709	✓	✓	10	SAT
4-4-02	1645	—	—	—	1	774	—	✓	—	SAT
4-8-02	0612	5	10	2	1	697	✓	✓	8	SAT
4-9-02	0607	5	8	1.6	1	702	✓	✓	8	SAT
4-9-02	1616	—	—	—	1	679	✓	✓	—	SAT
4-10-02	0610	5	7	1.4	1	696	✓	✓	7	SAT
4-10-02	1710	—	—	—	1	699	✓	✓	✓	Sat
			0							

EFF. 251

Daily Instrumentation Operational Check Sheet

Instrument: 2350-1 # 117566 Probe: 43-106 # 128912

Cal Due: 8-6-02 Cal Due: 8-6-02

Source ID: Tc 99 3935 Mean Source Count Rate: 5144 Mean +2 σ Value: 5282 Mean -2 σ Value: 5006

Radiation Type: β⁻ Sigma Value: 69 Mean +3 σ Value: 5351 Mean -3 σ Value: 5937

Background					Source Check				Results	
Date	Time	Count Time (min)	Gross Counts	BKGD CPM	Count Time (min)	Gross Counts	W/I 2 σ Value	W/I 3 σ Value	LLD	SAT/ UNSAT
4-8-02	0634	5	1709	342	1	5013	✓	✓	70	SAT
4-8-02	1650	—	—	—	1	5091	✓	✓	—	SAT
4-9-02	0634	5	1721	344	1	5077	✓	✓	70	SAT
4-10-02	0634	5	1709	342	1	5007	✓	✓	70	SAT
4-11-02	0634	5	1711	342	1	5014	✓	✓	70	SAT
4-11-02	1535	—	—	—	1	5229	✓	✓	—	SAT
4-15-02	0619	5	1705	341	1	5076	✓	✓	70	SAT
4-15-02	1700	—	—	—	1	5083	✓	✓	—	SAT
4-16-02	0624	5	1784	357	1	5061	✓	✓	71	SAT
4-16-02	1710	—	—	—	1	5138	✓	✓	—	SAT

EFF..212

Daily Instrumentation Operational Check Sheet

Instrument: 2350-1 #117566 Probe: 43-106 #128912

Cal Due: 8-6-02 Cal Due: 8-6-02

Source ID:	Th 230 3937	Mean Source Count Rate:	735	Mean +2 σ Value:	785	Mean -2 σ Value:	685
Radiation Type:	α	Sigma Value:	25	Mean +3 σ Value:	810	Mean -3 σ Value:	660

Background					Source Check				Results	
Date	Time	Count Time (min)	Gross Counts	BKGD CPM	Count Time (min)	Gross Counts	W/I 2 σ Value	W/I 3 σ Value	LLD	SAT/ UNSAT
4-8-02	0634	5	5	1	1	718	✓	✓	7	SAT
4-8-02	1650	—	—	—	1	732	✓	✓	—	SAT
4-9-02	0634	5	6	1.2	1	703	✓	✓	7	SAT
4-10-02	0634	5	7	1.4	1	721	✓	✓	7	SAT
4-11-02	0634	5	6	1.2	1	754	✓	✓	7	SAT
4-11-02	1550	—	—	—	1	745	✓	✓	—	SAT
4-15-02	0619	5	4	.8	1	729	✓	✓	6	SAT
4-15-02	1705	—	—	—	1	753	✓	✓	—	SAT
4-16-02	0624	5	4	.8	1	743	✓	✓	6	SAT
4-16-02	1712	—	—	—	1	706	✓	✓	—	SAT

EFF .212

Daily Instrumentation Operational Check Sheet

Instrument: 2350-1 # 117566 Probe: 43-106 # 128912

Cal Due: 8-6-02 Cal Due: 8-6-02

Source ID: Th230 3937 Mean Source Count Rate: 735 Mean +2 σ Value: 785 Mean -2 σ Value: 685

Radiation Type: α Sigma Value: 25 Mean +3 σ Value: 810 Mean -3 σ Value: 660

Background					Source Check				Results	
Date	Time	Count Time (min)	Gross Counts	BKGD CPM	Count Time (min)	Gross Counts	W/I 2 σ Value	W/I 3 σ Value	LLD	SAT/ UNSAT
3-7-02	1726	—	—	—	1	762	—	—	—	Sat
3-8-02	0635	5	7	1.4	1	741	✓	✓	9	sat
3-8-02	1400	—	—	—	1	745	—	—	—	Sat
3-11-02	0642	5	8	1.6	1	748	✓	✓	9	sat
3-12-02	0630	5	7	1.4	1	776	✓	✓	9	sat
3-15-02	0615	5	17	3.4	1	745	✓	✓	12	sat
3-18-02	1650	—	—	—	1	743	—	—	—	sat
3-19-02	0634	5	7	1.4	1	741	✓	✓	9	sat
3-20-02	0630	5	9	1.8	1	772	✓	✓	10	sat
3-20-02	1640	—	—	—	1	760	—	—	—	sat.
3-21-02	0634	5	9	1.8	1	704	✓	✓	10	sat
3-25-02	0624	5	10	2	1	741	✓	✓	8	sat
3-27-02	0640	5	9	1.8	1	744	✓	✓	8	sat
3-28-02	0634	5	6	1.2		750	✓	✓	7	sat
4-3-02	1650	—	—	—	1	780	—	—	—	Sat
4-4-02	0645	5	5	1	1	703	✓	✓	7	sat

EFF. 251

Daily Instrumentation Operational Check Sheet

Instrument: 2350-1 #117566 Probe: 43-106 #128912

Cal Due: 8-6-02 Cal Due: 8-6-02

Source ID:	Tc 99 3935	Mean Source Count Rate:	5144	Mean +2 σ Value:	5282	Mean -2 σ Value:	5006
Radiation Type:	β⁻	Sigma Value:	69	Mean +3 σ Value:	5351	Mean -3 σ Value:	5937

Background					Source Check				Results	
Date	Time	Count Time (min)	Gross Counts	BKGD CPM	Count Time (min)	Gross Counts	W/I 2 σ Value	W/I 3 σ Value	LLD	SAT/ UNSAT
3-7-02	1729	—	—	—	1	5146	—	—	—	Sat
3-8-02	0635	5	1679	~~3361679~~	1	5028	✓	✓	96	SAT
3-8-02	1400	—	—	—	1	5053	✓	✓	—	Sat
3-11-02	0642	5	1889	378	1	5029	✓	✓	102	SAT
3-12-02	0630	5	1894	379	1	5014	✓	✓	102	SAT
3-18-02	0616	5	1836	367	1	5107	✓	✓	100	SAT
3-18-02	1650	—	—	—	1	5020	—	—	—	Sat
3-19-02	0634	5	1735	347	1	5160	✓	✓	98	SAT
3-20-02	0630	5	1776	355	1	5273	✓	✓	99	SAT
3-20-02	1640	—	—	—	1	5062	—	—	—	Sat
3-21-02	0634	5	1745	349	1	5106	✓	✓	98	SAT
3-25-02	0624	5	1695	339	1	5148	✓	✓	52	SAT
3-27-02	0640	5	1771	354	1	5079	✓	✓	71	SAT
3-28-02	0634	5	1825	365	1	5032	✓	✓	72	SAT
4-03-02	1645	—	—	—	1	5169	—	—	—	Sat
4-4-02	0645	5	1751	350	1	5028	✓	✓	70	SAT

EFF. 248

Daily Instrumentation Operational Check Sheet

Instrument: 2350-1 #~~117014~~ 117566

Probe: 43-106 #133866

Cal Due: 8-~~13~~ 6-02

Cal Due: 8-6-02

Source ID:	Te99 3935	Mean Source Count Rate:	4720	Mean +2 σ Value:	4832	Mean -2 σ Value:	4608
Radiation Type:	β⁻	Sigma Value:	56	Mean +3 σ Value:	4888	Mean -3 σ Value:	4552

Background					Source Check				Results	
Date	Time	Count Time (min)	Gross Counts	BKGD CPM	Count Time (min)	Gross Counts	W/I 2 σ Value	W/I 3 σ Value	LLD	SAT/ UNSAT
4-11-02	0632	5	1687	337	1	4681	✓	✓	69	~~SAT~~
4-11-02	1602	—	—	—	1	4647	✓	✓	—	~~SAT~~
4-15-02	0617	5	1511	302	1	4801	✓	✓	66	~~SAT~~
4-15-02	1641	—	—	—	1	4799	✓	✓	—	~~SAT~~
4-16-02	0622	5	1624	325	1	4812	✓	✓	68	~~SAT~~
4-16-02	1714	—	—	—	1	4815	✓	✓	—	~~SAT~~

EFF. 211

Daily Instrumentation Operational Check Sheet

Instrument: 2350-1 # 117566 Probe: 43-106 # 133866

Cal Due: 8-6-02 Cal Due: 8-6-02

Source ID: Th230 3937 Mean Source Count Rate: 723 Mean +2 σ Value: 775 Mean -2 σ Value: 671

Radiation Type: α Sigma Value: 26 Mean +3 σ Value: 801 Mean -3 σ Value: 645

Background					Source Check				Results	
Date	Time	Count Time (min)	Gross Counts	BKGD CPM	Count Time (min)	Gross Counts	W/I 2 σ Value	W/I 3 σ Value	LLD	SAT/ UNSAT
4-11-02	0632	5	11	2.2	1	747	✓	✓	8	SAT
4-11-02	1605	—	—	—	1	736	✓	✓	—	SAT
4-15-02	0617	5	7	1.4	1	773	✓	✓	7	SAT
4-15-02	1640	—	—	—	1	719	✓	✓	—	SAT
4-16-02	0622	5	6	1.2	1	702	✓	✓	7	SAT
4-16-02	1716	—	—	—	1	738	✓	✓	—	SAT

EFF .211

Daily Instrumentation Operational Check Sheet

Instrument: 2350-1 # 117014 Probe: 43-106 # 133866

Cal Due: 8-6-02 Cal Due: 8-6-02

Source ID: Th230 3937 Mean Source Count Rate: 723 Mean +2 σ Value: 775 Mean -2 σ Value: 671

Radiation Type: α Sigma Value: 26 Mean +3 σ Value: 801 Mean -3 σ Value: 645

Background					Source Check				Results	
Date	Time	Count Time (min)	Gross Counts	BKGD CPM	Count Time (min)	Gross Counts	W/I 2 σ Value	W/I 3 σ Value	LLD	SAT/ UNSAT
3-26-02	0642	5	13	2.6	1	708	✓	✓	9	SAT
3-27-02	0632	5	9	1.8	1	705	✓	✓	8	SAT
3-27-02	1700	—	—	—	1	623	—	—	—	SAT
3-28-02	0632	5	6	1.2	1	757	✓	✓	7	SAT
3-28-02	1700	—	—	—	1	763	—	—	—	SAT
4-02-02	0940	5	3	.6	1	731	✓	✓	6	SAT
4-2-02	1515	—	—	—	1	718	—	—	—	SAT
4-3-02	0627	5	6	1.2	1	723	✓	✓	7	SAT
4-3-02	1630	—	—	—	1	741	—	—	—	SAT
4-4-02	0637	5	9	1.8	1	723	✓	✓	8	SAT
4-4-02	1705	—	—	—	1	711	✓	✓	—	SAT
4-8-02	0632	5	11	2.2	1	737	✓	✓	8	SAT
4-8-02	1700	—	—	—	1	678	✓	✓	—	SAT
4-9-02	0632	5	8	1.6	1	759	✓	✓	8	SAT
4-9-02	1630	—	—	—	1	738	✓	✓	—	SAT
4-10-02	0632	5	11	2.2	1	752	✓	✓	8	SAT

EFF. .248

Daily Instrumentation Operational Check Sheet

Instrument: 2350-1 # 117014 Probe: 43-106 # 133866

Cal Due: 8-13-02 Cal Due: 8-6-02

Source ID: Tc 99 3935 Mean Source Count Rate: 4720 Mean +2 σ Value: 4832 Mean -2 σ Value: 4608

Radiation Type: β⁻ Sigma Value: 56 Mean +3 σ Value: 4888 Mean -3 σ Value: 4552

Background					Source Check				Results	
Date	Time	Count Time (min)	Gross Counts	BKGD CPM	Count Time (min)	Gross Counts	W/I 2 σ Value	W/I 3 σ Value	LLD	SAT/ UNSAT
3-26-02	0642	5	1563	313	1	4738	✓	✓	67	SAT
3-27-02	0632	5	1560	312	1	4804	✓	✓	67	SAT
3-27-02	1700	—	—	—	1	4677	—	—	—	SAT
3-28-02	0632	5	1591	318	1	4802	✓	✓	67	SAT
3-28-02	1700	—	—	—	1	4701	—	—	—	SAT
4-2-02	0930	5	1576	315	1	4803	✓	✓	67	SAT
4-2-02	1515	—	—	—	1	4682	—	—	—	SAT
4-3-02	0627	5	1596	319	1	4696	✓	✓	67	SAT
4-3-02	1643	—	—	—	1	4745	✓	✓	—	SAT
4-4-02	0637	5	1564	313	1	4708	✓	✓	67	SAT
4-4-02	1710	—	—	—	1	4637	✓	✓	—	SAT
4-8-02	0632	5	1675	335	1	4808	✓	✓	69	SAT
4-8-02	1700	—	—	—	1	4744	✓	✓	—	SAT
4-9-02	0632	5	1647	329	1	~~4824~~	✓	✓	68	SAT
4-9-02	1630	—	—	—	1	4740	✓	✓	—	SAT
4-10-02	0632	5	1625	325	1	4816	✓	✓	68	SAT

EFF 211 ~~248~~

Daily Instrumentation Operational Check Sheet

Instrument: 2350-1 # 117014 Probe: 43-106 # 133866

Cal Due: 8-13-02 Cal Due: 8-6-02

Source ID: Tb230 3937 Mean Source Count Rate: 723 Mean +2 σ Value: 775 Mean -2 σ Value: 671

Radiation Type: α Sigma Value: 26 Mean +3 σ Value: 801 Mean -3 σ Value: 645

Background					Source Check				Results	
Date	Time	Count Time (min)	Gross Counts	BKGD CPM	Count Time (min)	Gross Counts	W/I 2 σ Value	W/I 3 σ Value	LLD	SAT/ UNSAT
3-7-02	0627	5	12	2.4	1	743	✓	✓	11	SAT
3-7-02	1719	—	—	—	1	677	—	—	—	SAT
3-8-02	0638	5	4	.8	1	747	✓	✓	7	SAT
3-8-02	1415	—	—	—	1	723	—	—	—	SAT
3-11-02	0637	5	7	1.4	1	712	✓	✓	9	SAT
3-12-02	0625	5	11	2.2	1	757	✓	✓	10	SAT
3-18-02	0614	5	7	1.4	1	749	✓	✓	9	SAT
3-18-02	1645	—	—	—	1	728	—	✓	—	SAT
3-19-02	0627	5	5	1	1	745	✓	✓	8	SAT
3-19-02	1630	—	—	—	1	690	—	—	—	SAT
3-20-02	0627	5	7	1.4	1	717	✓	✓	9	SAT
3-20-02	1700	—	—	—	1	762	—	—	—	SAT
3-21-02	0632	5	9	1.8	1	757	✓	✓	10	SAT
3-21-02	1040	—	—	—	1	1066	✓	✓	✓	SAT
3-25-02	0622	5	8	1.6	1	740	✓	✓	4	SAT
3-25-00	1845	—	—	—	1	679	—	—	—	S

Daily Instrumentation Operational Check Sheet

EFF. 248

Instrument: 2350-1 # 117014 Probe: 43-106 # 133866

Cal Due: 8-13-02 Cal Due: 8-6-02

Source ID:	Tc99 3935	Mean Source Count Rate:	4720	Mean +2 σ Value:	4832	Mean -2 σ Value:	4608
Radiation Type:	β⁻	Sigma Value:	56	Mean +3 σ Value:	4888	Mean -3 σ Value:	4552

Background					Source Check				Results	
Date	Time	Count Time (min)	Gross Counts	BKGD CPM	Count Time (min)	Gross Counts	W/I 2 σ Value	W/I 3 σ Value	LLD	SAT/ UNSAT
3-7-02	0627	5	1587	317	1	4723	✓	✓	93	SAT
3-7-02	1720	—	—	—	1	4659	—	—	—	Sat
3-8-02	0638	5	1582	316	1	4831	✓	✓	93	SAT
3-8-02	1415	—	—	—	1	4672	—	—	—	Sat
3-11-02	0637	5	1556	311	1	4708	✓	✓	92	SAT
3-12-02	0625	5	1604	321	1	4723	✓	✓	94	SAT
3-18-02	0614	5	1588	318	1	4721	✓	✓	93	SAT
3-18-02	1645	—	—	—	1	4634	—	—	—	Sat
3-19-02	0627	5	1442	288	1	4763	✓	✓	89	SAT
3-19-02	1630	—	—	—	1	4772	—	—	—	Sat
3-20-02	0627	5	1608	322	1	4768	✓	✓	94	SAT
3-20-02	1700	—	—	—	1	4782	—	—	—	Sat
3-21-02	0632	5	1528	306	1	4771	✓	✓	92	SAT
3-21-02	1640	—	—	—	1	4689	✓	✓	✓	Sat.
3-25-02	0622	5	1490	298	1	4746	✓	✓	49	SAT
3-25-02	1645	—	—	—	1	4654	—	—	—	S

Daily Instrumentation Operational Check Sheet

EFF. 27

Instrument: 2350-1 # 95359 Probe: 43-37 # 092503

Cal Due: 8-6-02 Cal Due: 8-6-02

Source ID: Tc99 3935 Mean Source Count Rate: 5308 Mean +2 σ Value: 5464 Mean -2 σ Value: 5152

Radiation Type: β- Sigma Value: 78 Mean +3 σ Value: 5542 Mean -3 σ Value: 5076

Background					Source Check				Results	
Date	Time	Count Time (min)	Gross Counts	BKGD CPM	Count Time (min)	Gross Counts	W/I 2 σ Value	W/I 3 σ Value	LLD	SAT/ UNSAT
4-11-02	0625	5	6469	1294	1	5400	✓	✓	133	SAT
4-11-02	1700	—	—	—	1	5328	—	—	—	SAT
4-15-02	0615	5	6492	1298	1	5364	✓	✓	133	SAT
4-15-02	1657	—	—	—	1	5389	✓	✓	—	SAT
4-16-02	0620	5	6469	1293	1	5406	✓	✓	133	SAT
4-16-02	1716	—	—	—	1	5363	✓	✓	—	SAT

EFF: 207

Daily Instrumentation Operational Check Sheet

Instrument: 2350-1 # 95359 Probe: 43-37 # 092503

Cal Due: 8-6-02 Cal Due: 8-6-02

Source ID: Th230 3937 Mean Source Count Rate: 729 Mean +2 σ Value: 783 Mean -2 σ Value: 675

Radiation Type: α Sigma Value: 27 Mean +3 σ Value: 810 Mean -3 σ Value: 648

Background					Source Check				Results	
Date	Time	Count Time (min)	Gross Counts	BKGD CPM	Count Time (min)	Gross Counts	W/I 2 σ Value	W/I 3 σ Value	LLD	SAT/ UNSAT
4-11-02	0625	5	64	~~64~~ 13	1	724	✓	✓	13	SAT
4-11-02	1650	—	✓	—	1	703	—	—	—	SAT
4-15-02	0615	5	39	7.8	1	771	✓	✓	13	SAT
4-15-02	1655	—	—	—	1	680	✓	✓	—	SAT
4-16-02	0620	5	42	8.4	1	743	✓	✓	13	SAT
4-16-02	1218	—	—	—	1	710	✓	✓	—	SAT

EFF. 27

Daily Instrumentation Operational Check Sheet

Instrument: 2350-1 # 95359 Probe: 43-37 # 092507

Cal Due: 8-6-02 Cal Due: 8-6-02

Source ID: TC 99 3935 Mean Source Count Rate: 5508 Mean +2 σ Value: 5464 Mean -2 σ Value: 5152

Radiation Type: B- Sigma Value: 78 Mean +3 σ Value: 5542 Mean -3 σ Value: 5026

Background					Source Check				Results	
Date	Time	Count Time (min)	Gross Counts	BKGD CPM	Count Time (min)	Gross Counts	W/I 2 σ Value	W/I 3 σ Value	LLD	SAT/ UNSAT
3-27-02	1725	—	—	—	1	5350	—	—	—	Sat
3-28-02	0630	5	6627	1325	1	5435	✓	✓	134	SAT
3-28-02	1650	—	—	—	1	5281	—	—	—	Sat
4-1-02	0710	5	6742	1348	1	5301	—	—	135	Sat
4-1-02	1645	—	—	—	1	5257	—	—	—	Sat
4-2-02	0630	5	6502	1300	1	5167	✓	✓	133	SAT
4-3-02	0630	5	6722	1344	1	5357	✓	✓	135	SAT
4-3-02	1650	—	—	—	1	5457	—	—	—	Sat
4-4-02	0635	5	6361	1272	1	5193	✓	✓	132	SAT
4-4-02	1700	—	—	—	1	5327	—	—	—	SAT
4-8-02	0630	5	6453	1291	1	5220	✓	✓	132	SAT
4-8-02	1705	—	—	—	1	5179	✓	✓	—	SAT
4-9-02	0630	5	6483	1297	1	5483	✓	✓	133	SAT
4-9-02	1634	—	—	—	1	5219	✓	✓	—	SAT
4-10-02	0630	5	6372	1274	1	5159	✓	✓	132	SAT
4-10-02	1710	—	—	—	1	5303	—	—	—	Sat

Daily Instrumentation Operational Check Sheet

FFF. 207

Instrument: 2350-1 #95359 Probe: 43-37 #092503

Cal Due: 8-6-02 Cal Due: 8-6-02

Source ID: TH230 3937 Mean Source Count Rate: 729 Mean +2 σ Value: 783 Mean -2 σ Value: 675

Radiation Type: α Sigma Value: 27 Mean +3 σ Value: 816 Mean -3 σ Value: 648

Background					Source Check				Results	
Date	Time	Count Time (min)	Gross Counts	BKGD CPM	Count Time (min)	Gross Counts	W/I 2 σ Value	W/I 3 σ Value	LLD	SAT/ UNSAT
3-27-02	1700	—	—	—	1	683	—	—	—	SAT
3-28-02	0630	5	61	12	1	770	✓	✓	15	SAT
3-28-02	1650	—	—	—	1	693	—	—		SAT
4-1-02	0705	5	62	12	1	724	—	—	15	SAT
4-1-02	1700	—	—	—	1	764	—	—	—	SAT
4-2-02	0630	5	78	16	1	742	✓	✓	17	SAT
4-3-02	0630	5	45	9	1	779	✓	✓	14	SAT
4-3-02	1655	—	—	—	1	744	—	—	—	SAT
4-4-02	0635	5	88	18	1	757	✓	✓	18	SAT
4-4-02	1700	—	—	—	— 1	725	—	—	—	SAT
4-8-02	0630	5	65	13	1	716	✓	✓	16	SAT
4-8-02	1710	—	—	—	1	681	✓	✓	—	SAT
4-9-02	0630	5	37	7.4	1	737	✓	✓	13	SAT
4-9-02	1635	—	—	—	1	709	✓	✓	—	SAT
4-10-02	0630	5	45	9	1	733	✓	✓	14	SAT
4-10-02	1700	—	—	—	1	742	—	—	—	SAT

EFF.207

Daily Instrumentation Operational Check Sheet

Instrument: 2350-1 # 95359 Probe: 43-37 # 092503

Cal Due: 8-6-02 Cal Due: 8-6-02

Source ID:	Th230 3937	Mean Source Count Rate:	729	Mean +2 σ Value:	783	Mean -2 σ Value:	675
Radiation Type:	α	Sigma Value:	27	Mean +3 σ Value:	810	Mean -3 σ Value:	648

Background					Source Check				Results	
Date	Time	Count Time (min)	Gross Counts	BKGD CPM	Count Time (min)	Gross Counts	W/I 2 σ Value	W/I 3 σ Value	LLD	SAT/ UNSAT
3-7-02	1722	—	—	—	1	759	—	—	—	Sat
3-8-02	1400	—	—	—	1	749	—	—	—	Sat
3-11-02	0635	5	82	16	1	774	✓	✓	23	sat
3-12-02	0625	5	49	10	1	776	✓	✓	19	sat
3-18-02	0612	5	72	14	1	729	✓	✓	22	sat
3-18-02	1655	—	—	—	1	759	—	—	—	sat
3-19-02	0625	5	47	9	1	706	✓	✓	19	sat
3-19-02	1630	—	—	—	1	735	—	—	—	sat.
3-20-02	0625	5	57	11	1	780	✓	✓	20	sat
3-20-02	1700	—	—	—	1	776	—	—	—	sat
3-21-02	0630	5	39	7.8	1	757	✓	✓	17	sat
3-25-02	0620	5	43	8.6	1	746	✓	✓	8.7	sat
3-25-02	1700	—	—	—	1	734	—	—	—	sat
3-26-02	0640	5	43	8.6	1	713	✓	✓	14	sat
3-26-02	1600	—	—	—	1	733	—	—	—	sat
3-27-02	0635	5	46	9.2	1	729	✓	✓	14	sat

EFF-27

Daily Instrumentation Operational Check Sheet

Instrument: 2350-1 # 95359 Probe: 43-37 # 092503

Cal Due: 8-6-02 Cal Due: 8-6-02

Source ID:	Tc 99 3935	Mean Source Count Rate:	5308	Mean +2 σ Value:	5464	Mean -2 σ Value:	5152
Radiation Type:	β-	Sigma Value:	78	Mean +3 σ Value:	5542	Mean -3 σ Value:	5076

Background					Source Check				Results	
Date	Time	Count Time (min)	Gross Counts	BKGD CPM	Count Time (min)	Gross Counts	W/I 2 σ Value	W/I 3 σ Value	LLD	SAT/ UNSAT
3-7-02	1724	—	—	—	1	5266	—	—	—	Sat.
3-8-02	1405	—	—	—	1	5292	—	—	—	Sat
3-11-02	0635	5	6437	1295	1	5346	✓	✓	186	SAT
3-12-02	0625	5	6303	1261	1	5282	✓	✓	184	SAT
3-18-02	0612	5	6496	1299	1	5406	✓	✓	186	SAT
3-18-02	1655	—	—	—	1	5160	—	—	—	SAT
3-19-02	0625	5	6295	1259	1	5221	✓	✓	184	SAT
3-19-02	1630	—	—	—	1	5297	—	—	—	SAT
3-20-02	0625	5	6747	1349	1	5425	✓	✓	190	SAT
3-20-02	1700	—	—	—	1	5252	—	—	—	SAT
3-21-02	0630	5	6303	1261	1	5221	✓	✓	184	SAT
3-25-02	0620	5	6352	1270	1	5273	✓	✓	101	SAT
3-25-02	1700	—	—	—	1	5242	✓	✓	✓	SAT
3-26-02	0640	5	6458	1292	1	5228	✓	✓	133	SAT
3-26-02	1600	—	—	—	1	5239	—	—	—	SAT
3-27-02	0635	5	6634	1327	1	5335	✓	✓	134	SAT

Ludlum Model 19 Micro-Rem

Routine Performance and Background Data Form

Instrument ID #: 22526	Cal. Due: 8-6-02	Source ID #: CS 137 #1610
Mean Source Value: 208	Mean plus + 20% Value: 250	Mean plus - 20% Value: 167

Date	Time	Meter Scale				Background Reading	Sat/Unsat
		25 µrem (sat/unsat)	50 µrem (sat/unsat)	250 µrem +/-20% value	500 µrem +/-20% value		
3-11-02	0618			200		12	S
3-12-02	0715			210		12	S
3-13-02	0615			190		13	SAT
3-14-02	0619			200		12	SAT
3-18-02	0610			200		12	SAT
3-19-02	0608			200		13	SAT
3-20-02	0609			200		12	SAT
3-21-02	0612			200		12	SAT
3-25-02	0603	N		200	N A	12	SAT
3-26-02	0630		A	200		13	SAT
3-27-02	0630			200		12	SAT
3-28-02	0615			200		12	SAT
4-1-02	0630			200		12	SAT
4-2-02	0614			200		12	SAT
4-3-02	0613			200		13	SAT
4-4-02	0650			200		12	SAT
4-8-02	0619			200		13	SAT
4-9-02	0620			180		12	SAT
4-10-02	0616			180		13	SAT

Ludlum Model 19 Micro-Rem

Routine Performance and Background Data Form

Instrument ID #: 22526	Cal. Due: 8/6/02	Source ID #: CS 137 1610
Mean Source Value: 208	Mean plus + 20% Value: 250	Mean plus - 20% Value: 167

Date	Time	Meter Scale				Background Reading	Sat/Unsat
		25 µrem (sat/unsat)	50 µrem (sat/unsat)	250 µrem +/-20% value	500 µrem +/-20% value		
2-12-02	08:00			200		10	Sat.
2-13-02	0700			180		9	SAT
2-14-02	0606			200		12	SAT
2-15-02	0600			200		11	SAT
2-18-02	0605			190		10	SAT
2-19-02	0605			200		10	SAT
2-20-02	0620			200		12	SAT
2-21-02	0610	N		200	N	12	SAT
2-22-02	0615		A	220	A	13	SAT
2-25-02	0620			200		12	SAT
2-26-02	0607			200		12	SAT
2-27-02	0612			200		13	SAT
2-28-02	0610			180		13	SAT
3-1-02	0615			200		12	SAT
3-4-02	0603			200		13	SAT
3-5-02	0604			200		13	SAT
3-6-02	0626			200		13	SAT
3-7-02	0603			180		13	SAT
3-8-02	0625			200		13	SAT

Ludlum Model 19 Micro-Rem

Routine Performance and Background Data Form

Instrument ID #: 22526	Cal. Due: 8-6-02	Source ID #: Cs 137 #1610
Mean Source Value: 208	Mean plus + 20% Value: 250	Mean plus - 20% Value: 167

Date	Time	Meter Scale				Background Reading	Sat/Unsat
		25 µrem (sat/unsat)	50 µrem (sat/unsat)	250 µrem +/-20% value	500 µrem +/-20% value		
4-11-02	0625			200		12	SAT
4-15-02	0620			200		13	SAT
4-16-02	0615			200		12	SAT
		N			N		
			A		A		

Ludlum Model 19 Micro-Rem

Routine Performance and Background Data Form

Instrument ID #: 115870	Cal. Due: 8-6-02	Source ID #: Cs 137 #1610
Mean Source Value: 204	Mean plus + 20% Value: 245	Mean plus - 20% Value: 163

Date	Time	Meter Scale				Background Reading	Sat/Unsat
		25 µrem (sat/unsat)	50 µrem (sat/unsat)	250 µrem +/-20% value	500 µrem +/-20% value		
4-11-02	0626			220		12	sat
4-15-02	0621			220		13	sat
4-16-02	0615			220		13	sat
		N			N		
			A		A		

Ludlum Model 19 Micro-Rem

Routine Performance and Background Data Form

Instrument ID #: 115870	Cal. Due: 8-6-02	Source ID #: CS 137 #1610
Mean Source Value: 204	Mean plus + 20% Value: 245	Mean plus - 20% Value: 163

Date	Time	Meter Scale				Background Reading	Sat/Unsat
		25 µrem (sat/unsat)	50 µrem (sat/unsat)	250 µrem +/-20% value	500 µrem +/-20% value		
3-12-02	0615			220		13	sat
3-13-02	0615			220		13	sat
3-14-02	0618			220		13	sat
3-18-02	0610			200		13	sat
3-19-02	0608			220		13	sat
3-20-02	0609			220		12	sat
3-21-02	0612			220		12	sat
3-25-02	0604			240	N	12	sat
3-26-02	0630	N		220	A	13	sat
3-27-02	0630		A	220		12	sat
3-28-02	0615			220		13	sat
4-1-02	0630			220		12	sat
4-2-02	0815			240		13	sat
4-3-02	0614			240		13	sat
4-4-02	0650			240		12	sat
4-8-02	0618			220		13	sat
4-9-02	0620			220		13	sat
4-10-02	0616			220		13	sat

Ludlum Model 19 Micro-Rem

Routine Performance and Background Data Form

Instrument ID #: 115870	Cal. Due: 8-6-02	Source ID #: Cs 137 #1610
Mean Source Value: 204	Mean plus + 20% Value: 245	Mean plus - 20% Value: 163

Date	Time	Meter Scale				Background Reading	Sat/Unsat
		25 µrem (sat/unsat)	50 µrem (sat/unsat)	250 µrem +/-20% value	500 µrem +/-20% value		
2-13-02	0700			210		9	S
2-14-02	0605			200		12	S
2-15-02	0600			240		11	S
2-18-02	0605			220		10	S
2-19-02	0605			200		10	S
2-20-02	0620			190		12	S
2-21-02	0610			220		12	S
2-22-02	0615			220		13	S
2-25-02	0620	N		210	N	13	S
2-26-02	0607		A	220	A	13	S
2-27-02	0612			220		12	S
2-28-02	0610			220		13	S
3-1-02	0615			220		12	S
3-4-02	0603			240		13	S
3-5-02	0608			240		13	S
3-6-02	0625			220		13	S
3-7-02	0603			200		13	S
3-8-02	0625			220		12	S
3-11-02	0619			220		12	S

EFF. 239

Daily Instrumentation Operational Check Sheet

Instrument: 2929 # 115563

Probe: 43-10 # 127216

Cal Due: 6-19-02

Cal Due: 6-19-02

Source ID: Tc 99 3935

Mean Source Count Rate: 3872

Mean +2 σ Value: 3994

Mean -2 σ Value: 3750

Radiation Type: β-

Sigma Value: 61

Mean +3 σ Value: 4055

Mean -3 σ Value: 3689

Background					Source Check				Results	
Date	Time	Count Time (min)	Gross Counts	BKGD CPM	Count Time (min)	Gross Counts	W/I 2 σ Value	W/I 3 σ Value	LLD	SAT/ UNSAT
4-15-02	0602	60	4341	72	1	3867	✓	✓	31	~~SAT~~
4-16-02	0600	↑	4289	71	↑	3824	✓	✓	31	~~SAT~~
		↓			↓					
		60			1					

EFF .35

Daily Instrumentation Operational Check Sheet

Instrument: 2929 # 115563

Probe: 43-10 # 127216

Cal Due: 6-19-02

Cal Due: 6-19-02

Source ID: Th 230 3937

Mean Source Count Rate: 1411

Mean +2 σ Value: 1485

Mean -2 σ Value: 1337

Radiation Type: α

Sigma Value: 37

Mean +3 σ Value: 1522

Mean -3 σ Value: 1300

Background					Source Check				Results	
Date	Time	Count Time (min)	Gross Counts	BKGD CPM	Count Time (min)	Gross Counts	W/I 2 σ Value	W/I 3 σ Value	LLD	SAT/ UNSAT
4-15-02	0602	60	8	.13	1	1410	✓	✓	4	SAT
4-16-02	0600	↑	4	.07	↑	1415	✓	✓	4	SAT
		↓			↓					
		60			1					

EFF . 239

Daily Instrumentation Operational Check Sheet

Instrument: 2929 # 115563 Probe: 43-10 # 127216

Cal Due: 6-19-02 Cal Due: 6-19-02

Source ID:	Tc 99 3935	Mean Source Count Rate:	3872	Mean +2 σ Value:	3994	Mean -2 σ Value:	3750
Radiation Type:	β-	Sigma Value:	61	Mean +3 σ Value:	4055	Mean -3 σ Value:	3689

Background					Source Check				Results	
Date	Time	Count Time (min)	Gross Counts	BKGD CPM	Count Time (min)	Gross Counts	W/I 2 σ Value	W/I 3 σ Value	LLD	SAT/ UNSAT
3-19-02	0605	~~60~~ 50	3476	70	1	3800	✓	✓	42	SAT
3-20-02	0605	50	3593	72		3772	✓	✓	42	SAT
3-21-02	0610	60	~~3459~~ 4246	70		3764	✓	✓	42	SAT
3-22-02	1110	60	4246	71		3758	✓	✓	7.2	SAT
3-25-02	0655	60	4204	70		3790	✓	✓	7.1	SAT
3-26-02	0610	60	4191	70		3760	✓	✓	30	SAT
3-27-02	0600	60	4160	70		3750	✓	✓	30	SAT
3-28-02	0600	60	4221	70		3774	✓	✓	30	SAT
4-1-02	0650	60	4408	73		3793	✓	✓	31	Sat
4-2-02	0610	60	4382	73		3768	✓	✓	31	SAT
4-3-02	0600	60	4387	73		3952	✓	✓	31	SAT
4-4-02	0615	60	4176	70		3819	✓	✓	30	SAT
4-8-02	0608	60	4209	70		3825	✓	✓	30	SAT
4-9-02	0600	60	4283	71		3813	✓	✓	31	SAT
4-10-02	0605	60	4123	69		3786	✓	✓	30	SAT
4-11-02	0610	60	4254	71	1	3769	✓	✓	31	SAT

Daily Instrumentation Operational Check Sheet

EFF .35

Instrument: 2929 # 115563

Probe: 43-10 # 127216

Cal Due: 6-19-02

Cal Due: 6-19-02

Source ID: Th 230 3937

Mean Source Count Rate: 1411

Mean +2 σ Value: 1485

Mean -2 σ Value: 1337

Radiation Type: α

Sigma Value: 37

Mean +3 σ Value: 1522

Mean -3 σ Value: 1300

Background					Source Check				Results	
Date	Time	Count Time (min)	Gross Counts	BKGD CPM	Count Time (min)	Gross Counts	W/I 2 σ Value	W/I 3 σ Value	LLD	SAT/ UNSAT
3-19-02	0605	~~60~~ 50	18	.36	1	1462	✓	✓	6	SAT
3-20-02	0605	50	8	.16		1382	✓	✓	5	SAT
3-21-02	0610	60	12	.2 ~~.14~~		1426	✓	✓	5	SAT
3-22-02	1110	60	24	.4		1437	✓	✓	.6	SAT
3-25-02	0655	60	20	.3		1423	✓	✓	.5	SAT
3-26-02	0610	60	13	.2		1398	✓	✓	4.5	SAT
3-27-02	0600	60	11	.18		1474	✓	✓	4	SAT
3-28-02	0600	60	14	.23		1422	✓	✓	5	SAT
4-1-02	0650	60	13	.2		1433	✓	✓	4	Sat
4-2-02	0610	60	26	.4		1397	✓	✓	5	SAT
4-3-02	0600	60	17	.3		1423	✓	✓	5	SAT
4-4-02	0615	60	11	.18		1457	✓	✓	4	SAT
4-8-02	0608	60	8	.13		1408	✓	✓	4	SAT
4-9-02	0600	60	21	.35		1428	✓	✓	5	SAT
4-10-02	0605	60	7	.12		1415	✓	✓	4	SAT
4-11-02	0610	60	5	.08	1	1451	✓	✓	4	SAT

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Daily Instrumentation Operational Check Sheet

Instrument: 2929 # 115563 Probe: 43-10 # 127216

Cal Due: 6-19-02 Cal Due: 6-19-02

Source ID: Th 230 3937 Mean Source Count Rate: 1411 Mean +2 σ Value: 1485 Mean -2 σ Value: 1337

Radiation Type: α Sigma Value: 37 Mean +3 σ Value: 1522 Mean -3 σ Value: 1300

Background					Source Check				Results	
Date	Time	Count Time (min)	Gross Counts	BKGD CPM	Count Time (min)	Gross Counts	W/I 2 σ Value	W/I 3 σ Value	LLD	SAT/ UNSAT
2-23-02	1310	50	8	.16	1	1377	✓	✓	5	SAT
2-25-02	0600	↑	9	.18	↑	1399	✓	✓	5	SAT
2-26-02	0603		5	.1		1457	✓	✓	4	SAT
2-27-02	0600		9	.18		1451	✓	✓	5	SAT
2-28-02	0600		7	.14		1435	✓	✓	4	SAT
3-1-02	0600		9	.18		1423	✓	✓	5	SAT
3-4-02	0610		11	.22		1395	✓	✓	5	SAT
3-5-02	0605		7	.14		1472	✓	✓	4	SAT
3-6-02	0605		11	.22		1408	✓	✓	5	SAT
3-7-02	0600		8	.16		1399	✓	✓	5	SAT
3-8-02	0615		7	.14		1365	✓	✓	4	SAT
3-11-02	0615		6	.12		1409	✓	✓	4	SAT
3-12-02	0610		9	.18		1407	✓	✓	5	SAT
3-13-02	0610		10	.2		1446	✓	✓	5	SAT
3-14-02	0615	↓	11	.22	↓	1453	✓	✓	5	SAT
3-18-02	0700	50	16	.32	1	1434	✓	✓	5	SAT

Daily Instrumentation Operational Check Sheet

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Instrument: 2929 #115563 Probe: 43-10 #127216

Cal Due: 6-19-02 Cal Due: 6-19-02

Source ID: Tc 99 3935 Mean Source Count Rate: 3872 Mean +2 σ Value: 3994 Mean -2 σ Value: 3750

Radiation Type: β- Sigma Value: 61 Mean +3 σ Value: 4055 Mean -3 σ Value: 3689

Background					Source Check				Results	
Date	Time	Count Time (min)	Gross Counts	BKGD CPM	Count Time (min)	Gross Counts	W/I 2 σ Value	W/I 3 σ Value	LLD	SAT/ UNSAT
2-23-02	1310	50	3503	70	1	3855	✓	✓	42	SAT
2-25-02	0600		3542	71		3750	✓	✓	42	SAT
2-26-02	0603		3505	70		3785	✓	✓	42	SAT
2-27-02	0600		3465	69		3754	✓	✓	42	SAT
2-28-02	0600		3500	70		3823	✓	✓	42	SAT
3-1-02	0600		3474	69		3794	✓	✓	42	SAT
3-4-02	0600		3433	69		3886	✓	✓	42	SAT
3-5-02	0605		3479	70		3815	✓	✓	42	SAT
3-6-02	0605		3533	71		3835	✓	✓	42	SAT
3-7-02	0600		3463	69		3780	✓	✓	42	SAT
3-8-02	0615		3534	71		3839	✓	✓	42	SAT
3-11-02	0615		3472	69		3783	✓	✓	42	SAT
3-12-02	0610		3433	69		3766	✓	✓	42	SAT
3-13-02	0610		3468	69		3794	✓	✓	42	SAT
3-14-02	0615		3509	70		3794	✓	✓	42	SAT
3-18-02	0700	50	3503	70	1	3808	✓	✓	42	SAT

DETERMINATION OF SOURCE QC LIMITS

Instrument: 2929 ID: 115563 Date: 2-22-02

Detector: 43-10 ID: 127216 Operating Voltage: 1045

20 Source-Count: Alpha			
Source ID: Th230 3937			
Count	Gross Cts (x_i)	$(x_i)-(\bar{x})$	$[(x_i)-(\bar{x})]^2$
1	1424	13	169
2	1351	-60	3600
3	1426	15	225
4	1385	-26	676
5	1419	8	64
6	1423	12	144
7	1442	31	961
8	1420	9	81
9	1402	-9	81
10	1345	-66	4356
11	1447	36	1296
12	1367	-44	1936
13	1414	3	9
14	1439	28	784
15	1452	41	1681
16	1340	-71	5041
17	1438	27	729
18	1389	-22	484
19	1419	8	64
20	1476	65	4225

$\bar{x}$ =	1411	σ =	37
2σ =	74	3σ =	111

20 Source-Count: Beta			
Source ID: Tc99 3935			
Count	Gross Cts (x_i)	$(x_i)-(\bar{x})$	$[(x_i)-(\bar{x})]^2$
1	4045	173	29929
2	3853	-19	361
3	3909	37	1369
4	3900	28	784
5	3838	-34	1156
6	3870	-2	4
7	3862	-10	100
8	3904	32	1024
9	3796	-76	5776
10	3962	90	8100
11	3905	33	1089
12	3851	-21	441
13	3870	-2	4
14	3862	-10	100
15	3804	-68	4624
16	3850	-22	484
17	3910	38	1444
18	3835	-37	1369
19	3881	9	81
20	3958	114	12996

$\bar{x}$ =	3872	σ =	61
2σ =	122	3σ =	183

Mean	Sigma
$\bar{x} = \frac{\sum x_i}{20}$	$\sigma = \sqrt{\frac{\Sigma(x_i - \bar{x})^2}{(n-1)}}$

Where:
σ = standard deviation
$\bar{x}$ = mean count
x_i = each individual measurement
n = number of measurements

Chi-squared

$$X^2 = \frac{\sum(n-\bar{n})^2}{\bar{n}}$$

Where:
n = data for individual counts
$\bar{n}$ = average of the twenty data points

Alpha Values	
mean +2 σ = 1485	mean -2 σ = 1337
mean +3 σ = 1522	mean -3 σ = 1300
X^2 = 18.8	

Beta Values	
mean +3 σ = 4055	mean -2 σ = 3750
mean +2 σ = 3994	mean -3 σ = 3689
X^2 = 18.3	

Reviewed: [signature] Date: 3-14-02

Daily Instrumentation Operational Check Sheet

EFF .165

Instrument: 2929 # 152202

Probe: 43-10 # 156519

Cal Due: 2-6-03

Cal Due: 2-6-03

Source ID: Tc 99 3935

Mean Source Count Rate: 2630

Mean +2 σ Value: 2720

Mean -2 σ Value: 2540

Radiation Type: β-

Sigma Value: 45

Mean +3 σ Value: 2765

Mean -3 σ Value: 2495

Background					Source Check				Results	
Date	Time	Count Time (min)	Gross Counts	BKGD CPM	Count Time (min)	Gross Counts	W/I 2 σ Value	W/I 3 σ Value	LLD	SAT/ UNSAT
4-15-02	0602	60	2766	46	1	2593	✓	✓	25	~~sat~~
4-16-02	0600		2786	46		2586	✓	✓	25	~~sat~~
		60			1					

EFF 3445

Daily Instrumentation Operational Check Sheet

Instrument: 2929 # 152202

Probe: 43-10 # 156519

Cal Due: 2-6-03

Cal Due: 2-6-03

Source ID: Th230 3937

Mean Source Count Rate: 1220

Mean +2 σ Value: 1304

Mean -2 σ Value: 1136

Radiation Type: α

Sigma Value: 42

Mean +3 σ Value: 1346

Mean -3 σ Value: 1094

Background					Source Check				Results	
Date	Time	Count Time (min)	Gross Counts	BKGD CPM	Count Time (min)	Gross Counts	W/I 2 σ Value	W/I 3 σ Value	LLD	SAT/ UNSAT
4-15-02	0602	60	7	.12	1	1143	✓	✓	4	~~SAT~~
4-16-02	0600	↑	5	.08	↑	1245	✓	✓	4	~~SAT~~
		60			1					

EFF .165

Daily Instrumentation Operational Check Sheet

Instrument: 2929 # 152202 Probe: 43-10 # 156519

Cal Due: 2-6-03 Cal Due: 2-6-03

Source ID:	Tc 99 3935	Mean Source Count Rate:	2630	Mean +2 σ Value:	2720	Mean -2 σ Value:	2540
Radiation Type:	β⁻	Sigma Value:	45	Mean +3 σ Value:	2765	Mean -3 σ Value:	2495

Background					Source Check				Results	
Date	Time	Count Time (min)	Gross Counts	BKGD CPM	Count Time (min)	Gross Counts	W/I 2 σ Value	W/I 3 σ Value	LLD	SAT/ UNSAT
3-19-02	0607	~~50~~ 50	2235	45	1	2553	✓	✓	34	SAT
3-20-02	0605	50	2248	46		2559	✓	✓	35	SAT
3-21-02	0610	60	~~2692~~	~~0444~~ 45		2561	✓	✓	34	SAT
3-22-02	1110	60	2771	46		2580	✓	✓	5.8	SAT
3-25-02	0655	60	2584	43		2551	✓	✓	5.6	SAT
3-26-02	0610	60	2715	45		2619	✓	✓	25	SAT
3-27-02	0600	60	2760	46		2570	✓	✓	25	SAT
3-28-02	0600	60	2771	45		2564	✓	✓	25	SAT
4-1-02	0630	60	2731	46		2555	✓	✓	25	Sat
4-2-02	0610	60	2751	46		2596	✓	✓	25	SAT
4-3-02	0600	60	2828	47		2578	✓	✓	26	SAT
4-4-02	0615	60	2786	46		2584	✓	✓	25	SAT
4-8-02	0608	60	2833	47		2628	✓	✓	26	SAT
4-9-02	0600	60	2737	46		2607	✓	✓	25	SAT
4-10-02	0605	60	2720	46		2594	✓	✓	25	SAT
4-11-02	0610	60	2722	45	1	2600	✓	✓	25	SAT

EFF .344.

Daily Instrumentation Operational Check Sheet

Instrument: 2929 # 152202 Probe: 43-10 # 156519

Cal Due: 2-6-03 Cal Due: 2-6-03

Source ID: Th230 3437 Mean Source Count Rate: 1220 Mean +2 σ Value: 1304 Mean -2 σ Value: 1136

Radiation Type: α Sigma Value: 42 Mean +3 σ Value: 1346 Mean -3 σ Value: 1094

Background					Source Check				Results	
Date	Time	Count Time (min)	Gross Counts	BKGD CPM	Count Time (min)	Gross Counts	W/I 2 σ Value	W/I 3 σ Value	LLD	SAT/ UNSAT
3-19-02	0607	50	18	.36	1	1145	✓	✓	6	SAT
3-20-02	0605	50	6	.12		1147	✓	✓	4	SAT
3-21-02	0610	60	12	.2		1239	✓	✓	5	SAT
3-22-02	0610	60	51	.85		1216	✓	✓	.82	SAT
3-25-02	0655	60	22	.36		1184	✓	✓	.55	SAT
3-26-02	0610	60	4	.07		1193	✓	✓	4	SAT
3-27-02	0600	60	8	.13		1190	✓	✓	4	SAT
3-28-02	0600	60	9	.15		1160	✓	✓	4	SAT
4-1-02	0630	60	9	.15		1200	✓	✓	4	Sat
4-2-02	0610	60	4	.07		1209	✓	✓	4	SAT
4-3-02	0600	60	7	.12		1191	✓	✓	4	SAT
4-4-02	0615	60	7	.12		1171	✓	✓	4	SAT
4-8-02	0608	60	13	.22		1173	✓	✓	5	SAT
4-9-02	0600	60	8	.13		1213	✓	✓	4	SAT
4-10-02	0605	60	7	.12		1140	✓	✓	4	SAT
4-11-02	0610	60	5	.08	1	1147	✓	✓	4	SAT

EFF. 165

Daily Instrumentation Operational Check Sheet

Instrument: 2929 # 152202 Probe: 43-10 # 156519

Cal Due: 2-6-03 Cal Due: 2-6-03

Source ID:	Tc99 3935	Mean Source Count Rate:	2630	Mean +2 σ Value:	2720	Mean -2 σ Value:	2540
Radiation Type:	β⁻	Sigma Value:	45	Mean +3 σ Value:	2765	Mean -3 σ Value:	2495

Background					Source Check				Results	
Date	Time	Count Time (min)	Gross Counts	BKGD CPM	Count Time (min)	Gross Counts	W/I 2 σ Value	W/I 3 σ Value	LLD	SAT/ UNSAT
2-23-02	1310	50	2266	45	1	2656	✓	✓	34	SAT
2-25-02	0600	↑	2331	47	↑	2660	✓	✓	35	SAT
2-26-02	0603		2388	48		2621	✓	✓	35	SAT
2-27-02	0600		2212	44		2636	✓	✓	34	SAT
2-28-02	0600		2299	46		2562	✓	✓	35	SAT
3-1-02	0600		2251	45		2592	✓	✓	34	SAT
3-4-02	0600		2288	46		2652	✓	✓	35	SAT
3-5-02	0605		2193	44		2571	✓	✓	34	SAT
3-6-02	0605		2207	44		2581	✓	✓	34	SAT
3-7-02	0600		2247	45		2579	✓	✓	34	SAT
3-8-02	0615		2279	46		2564	✓	✓	35	SAT
3-11-02	0615		2245	45		2571	✓	✓	34	SAT
3-12-02	0612		2166	43		2559	✓	✓	34	SAT
3-13-02	0610		2278	46		2548	✓	✓	35	SAT
3-14-02	0615	↓	2250	45	↓	2680	✓	✓	34	SAT
3-18-02	0700	50	2280	46	1	2615	✓	✓	35	SAT

EFF-344

Daily Instrumentation Operational Check Sheet

Instrument: 2929 # 152202 Probe: 43-10 # 156519

Cal Due: 2-6-03 Cal Due: 2-6-03

Source ID: Th230 3939 Mean Source Count Rate: 1220 Mean +2 σ Value: 1304 Mean -2 σ Value: 1136

Radiation Type: α Sigma Value: 42 Mean +3 σ Value: 1346 Mean -3 σ Value: 1094

Background					Source Check				Results	
Date	Time	Count Time (min)	Gross Counts	BKGD CPM	Count Time (min)	Gross Counts	W/I 2 σ Value	W/I 3 σ Value	LLD	SAT/ UNSAT
2-23-02	1310	50	7	.14	1	1224	✓	✓	4	SAT
2-25-02	0600		8	.16		1273	✓	✓	5	SAT
2-26-02	0603		7	.14		1193	✓	✓	4	SAT
2-27-02	0600		9	.18		1202	✓	✓	5	SAT
2-28-02	0600		16	.32		1217	✓	✓	5	SAT
3-1-02	0600		9	.18		1195	✓	✓	5	SAT
3-4-02	0600		8	.16		1232	✓	✓	5	SAT
3-5-02	0605		7	.14		1206	✓	✓	4	SAT
3-6-02	0605		13	.26		1212	✓	✓	5	SAT
3-7-02	0600		7	.14		1176	✓	✓	4	SAT
3-8-02	0615		8	.16		1247	✓	✓	5	SAT
3-11-02	0615		6	.12		1282	✓	✓	4	SAT
3-12-02	0612		3	.06		1196	✓	✓	4	SAT
3-13-02	0610		14	.28		1229	✓	✓	5	SAT
3-14-02	0615		8	.16		1233	✓	✓	5	SAT
3-18-02	0700	50	8	.16	1	1206	✓	✓	5	SAT

DETERMINATION OF SOURCE QC LIMITS

Instrument: 2929 ID: 152202 Date: 2-22-02

Detector: 43-10 ID: 156519 Operating Voltage: 750

20 Source-Count: Alpha			
Source ID: Th 230 3937			
Count	Gross Cts (x_i)	$(x_i)-(\bar{x})$	$[(x_i)-(\bar{x})]^2$
1	1187	-33	1089
2	1206	-14	196
3	1294	76	5776
4	1249	27	729
5	1246	26	676
6	1212	-8	64
7	1175	-45	2025
8	1197	-23	529
9	1276	56	3136
10	1172	-48	2304
11	1308	88	7744
12	1197	-23	529
13	1219	-1	1
14	1217	-3	9
15	1205	-15	225
16	1196	-24	576
17	1267	47	2209
18	1225	5	25
19	1157	-63	3969
20	1188	-32	1024

$\bar{x}$ =	1220	σ =	42
2σ =	84	3σ =	126

20 Source-Count: Beta			
Source ID: Tc 99 3935			
Count	Gross Cts (x_i)	$(x_i)-(\bar{x})$	$[(x_i)-(\bar{x})]^2$
1	2627	-3	9
2	2614	-16	256
3	2660	30	900
4	2673	43	1849
5	2608	-22	484
6	2723	93	8649
7	2577	-53	2809
8	2616	-14	196
9	2610	-20	400
10	2680	50	2500
11	2542	-88	7744
12	2616	-14	196
13	2562	-68	4624
14	2627	-3	9
15	2595	-35	1225
16	2682	52	2704
17	2684	54	2916
18	2623	-7	49
19	2657	27	729
20	2635	5	25

$\bar{x}$ =	2630	σ =	45
2σ =	90	3σ =	135

Mean	Sigma
$\bar{x} = \frac{\sum x_i}{20}$	$\sigma = \sqrt{\frac{\Sigma(x_i - \bar{x})^2}{(n-1)}}$

Where:
σ = standard deviation
$\bar{x}$ = mean count
x_i = each individual measurement
n = number of measurements

Chi-squared

$$X^2 = \frac{\sum(n-\bar{n})^2}{\bar{n}}$$

Where:
n = data for individual counts
$\bar{n}$ = average of the twenty data points

Alpha Values	
mean +2 σ = 1304	mean -2 σ = 1136
mean +3 σ = 1346	mean -3 σ = 1094
X^2 = 26.9	

Beta Values	
mean +3 σ = 2765	mean -2 σ = 2540
mean +2 σ = 2720	mean -3 σ = 2495
X^2 = 14.5	

Reviewed: [signature] Date: 3-14-02